

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

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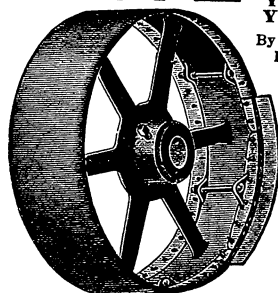
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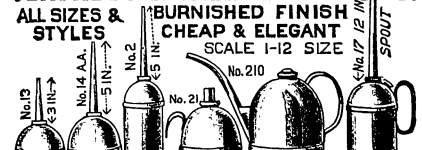
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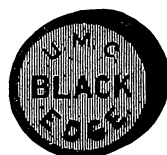
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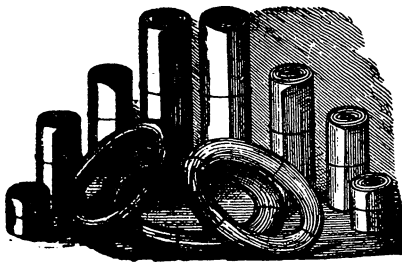
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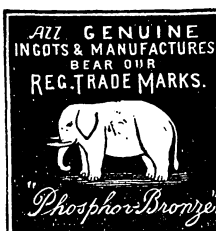
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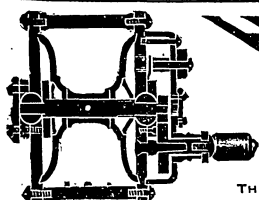
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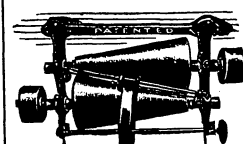
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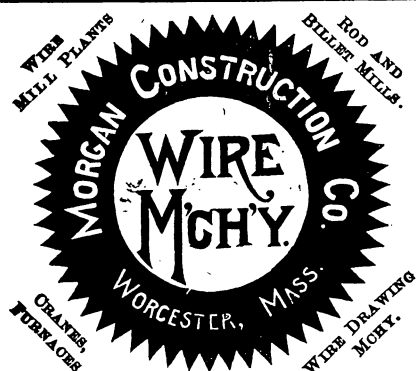
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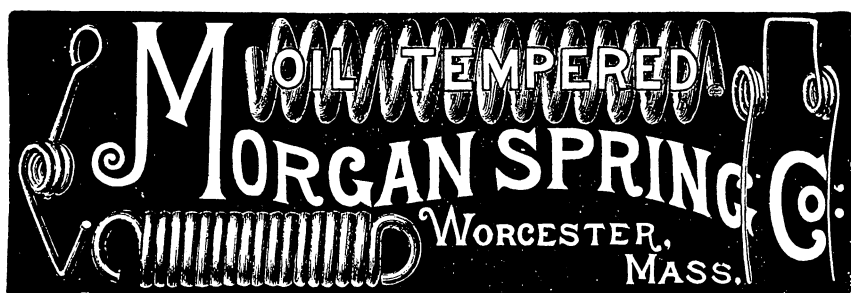
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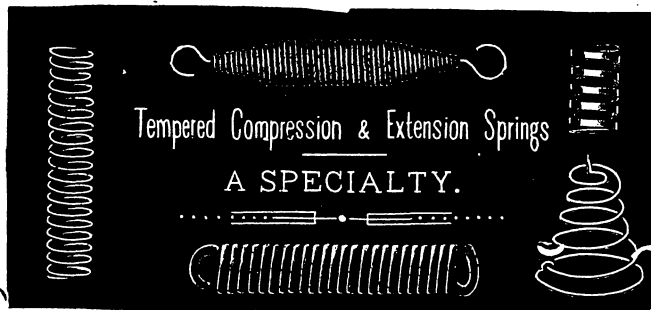
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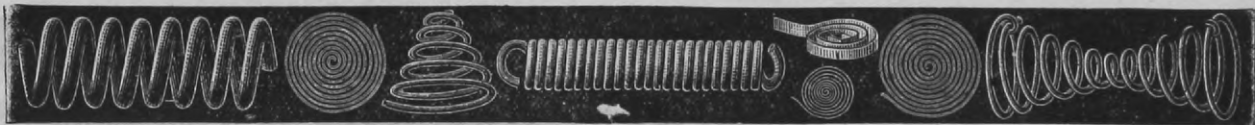
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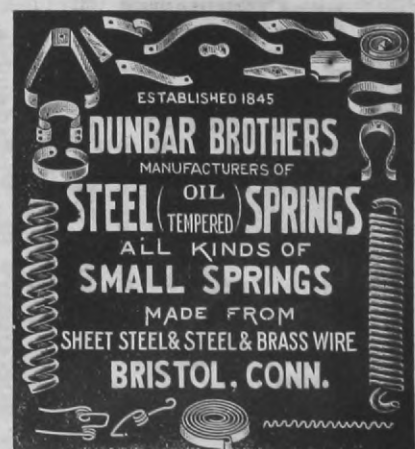
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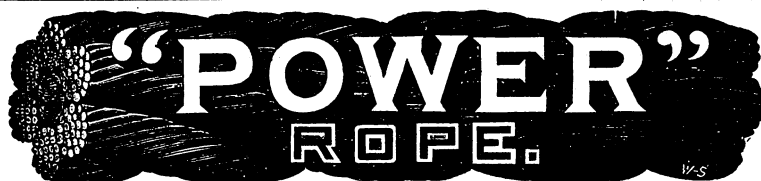
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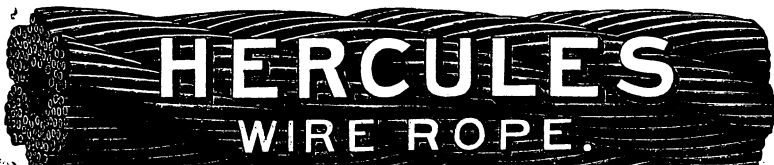
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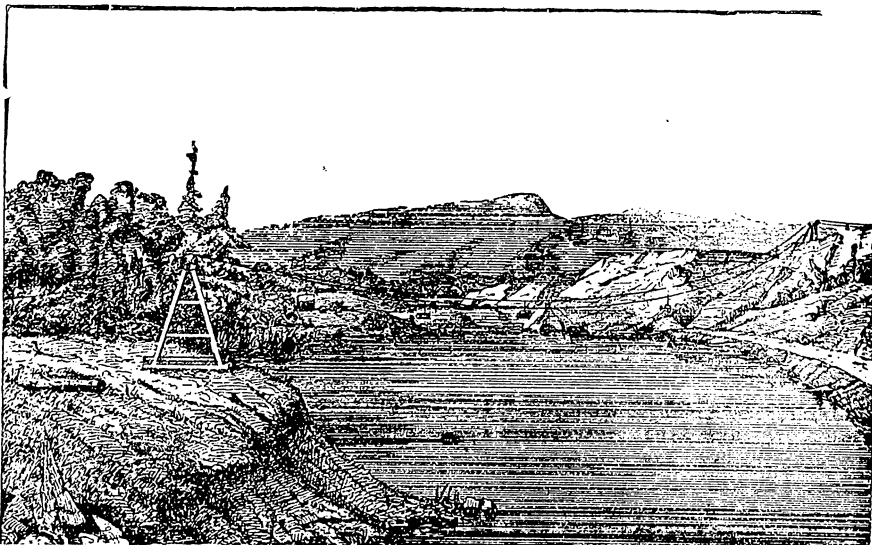
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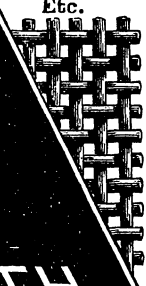
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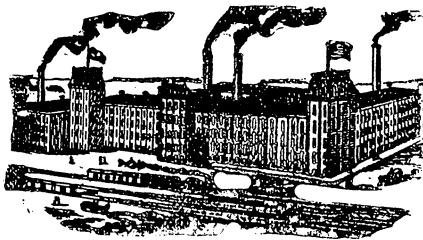
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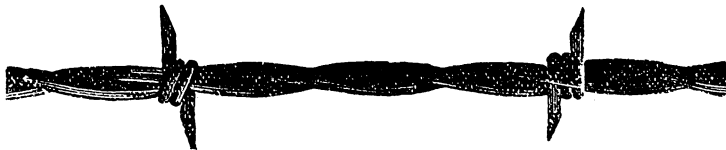
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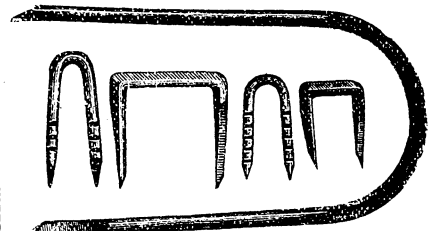
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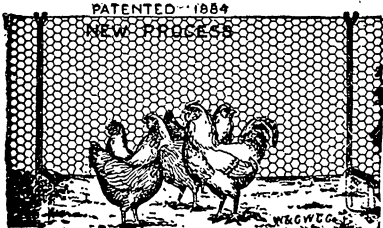
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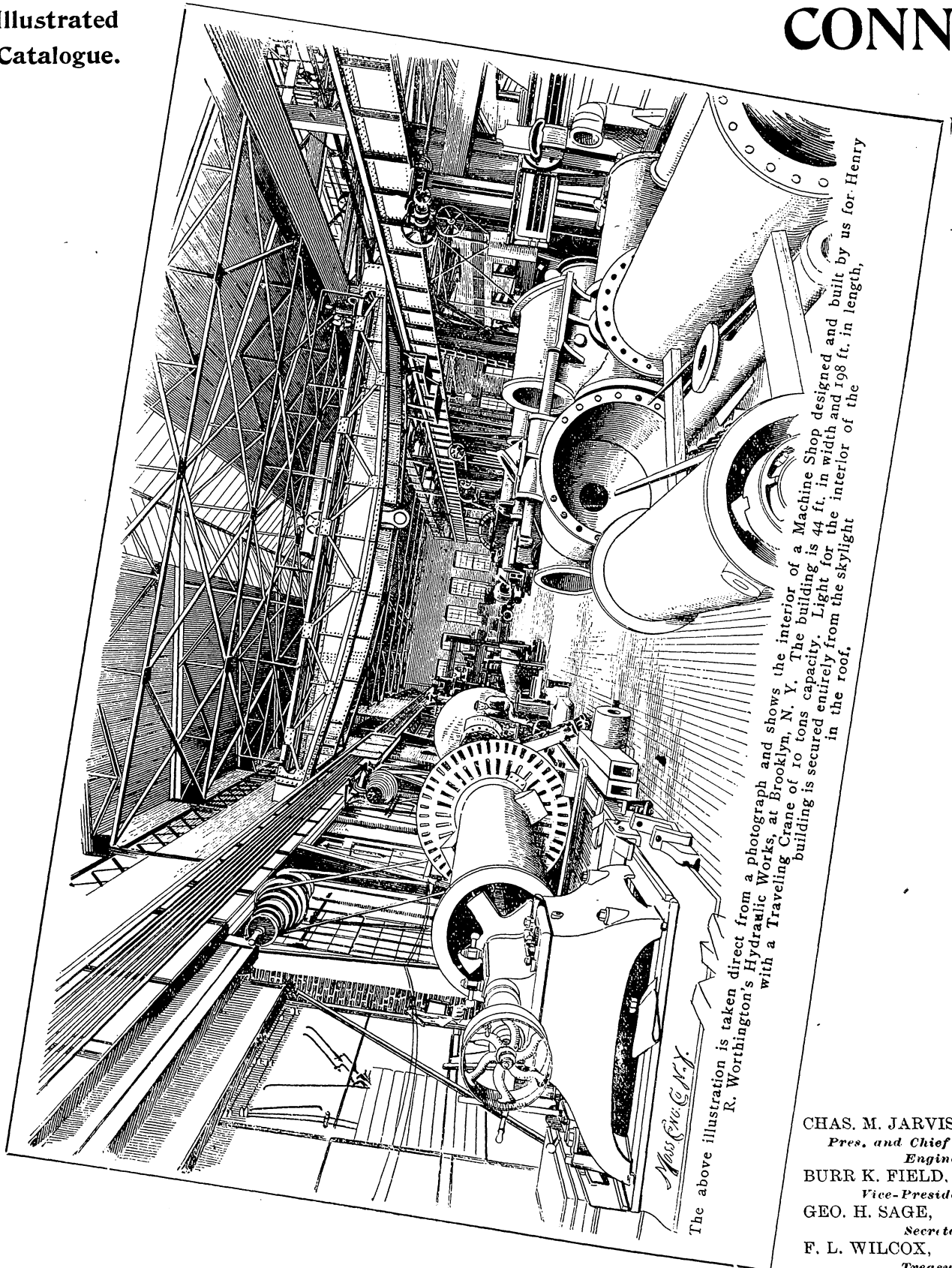
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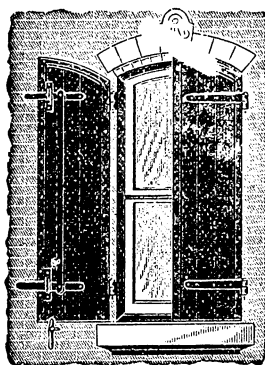
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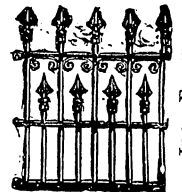
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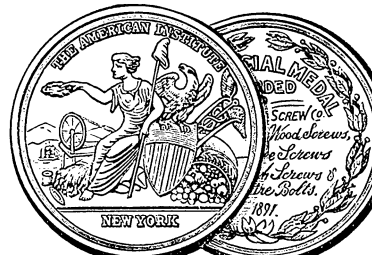
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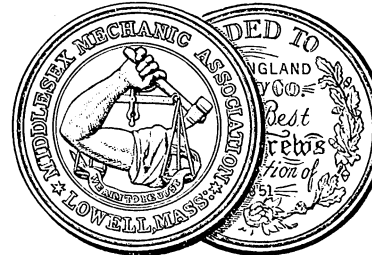
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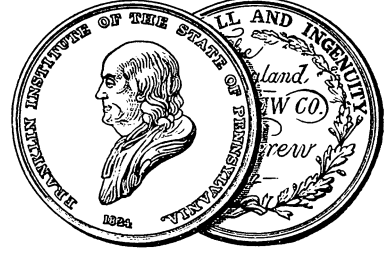
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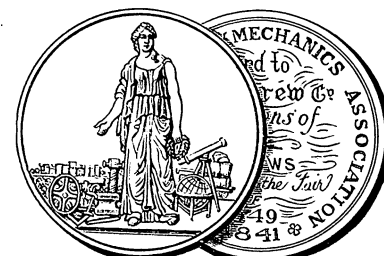
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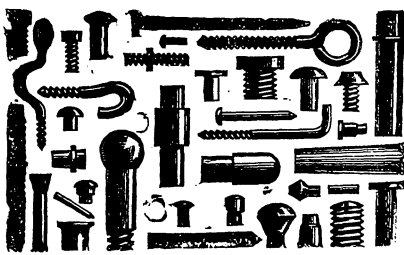
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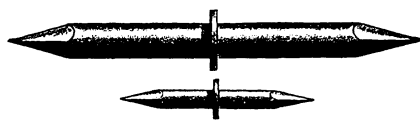
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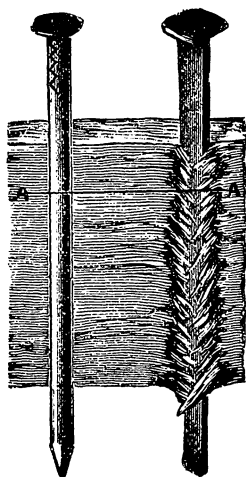
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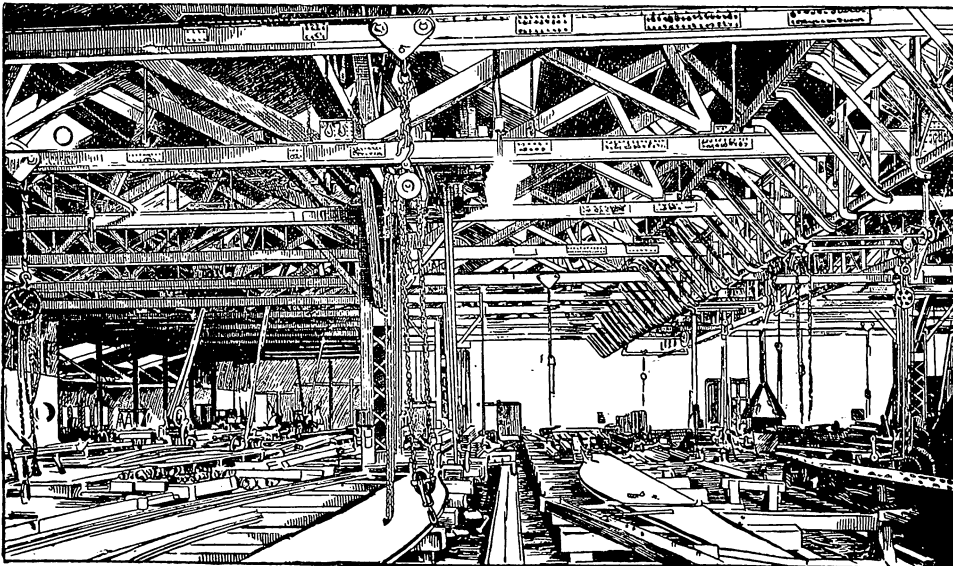
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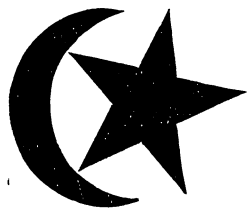
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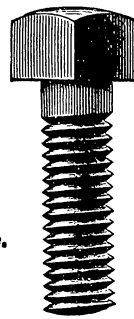
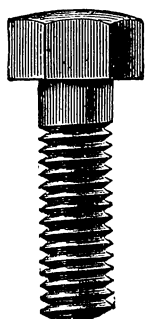
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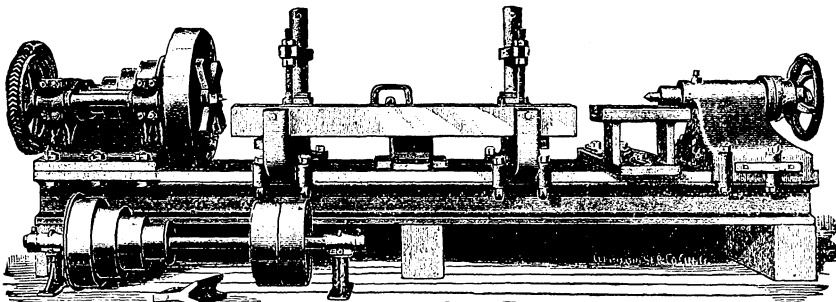
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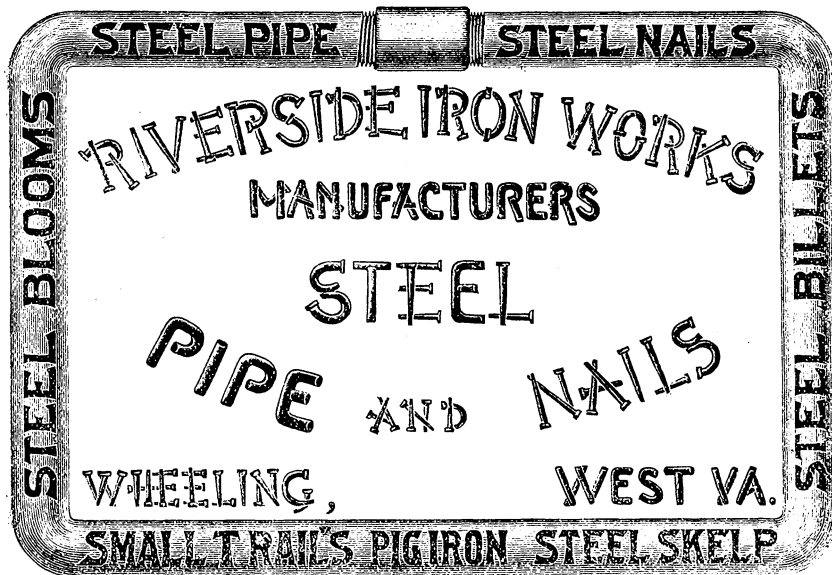
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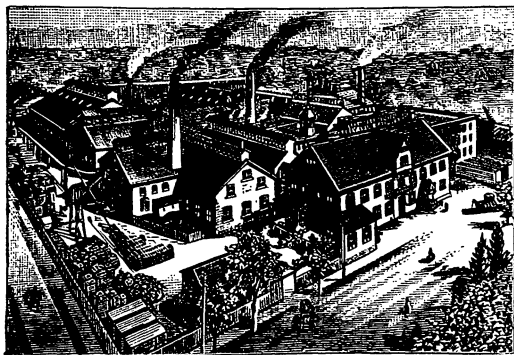
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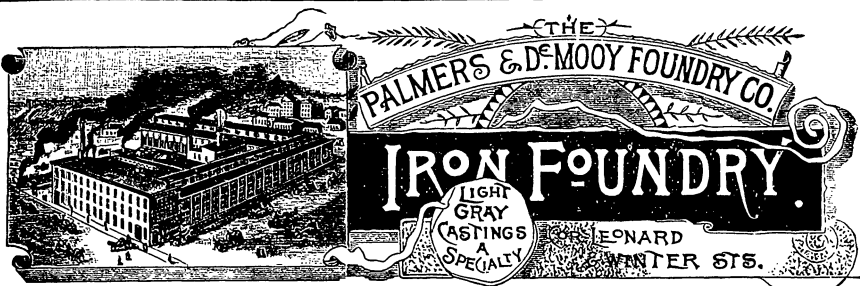
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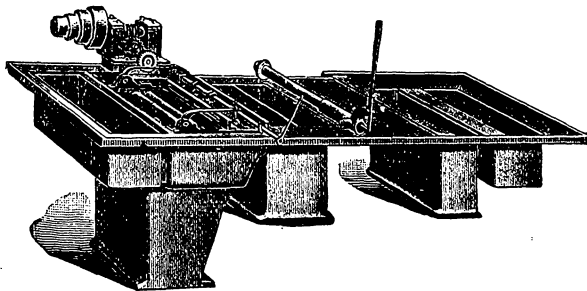
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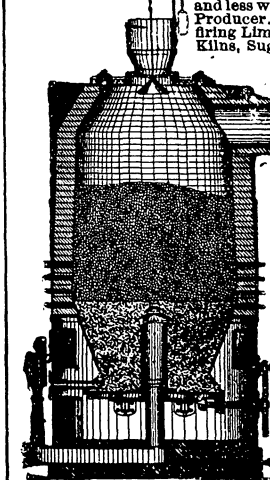
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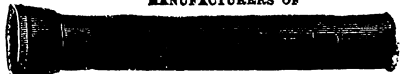
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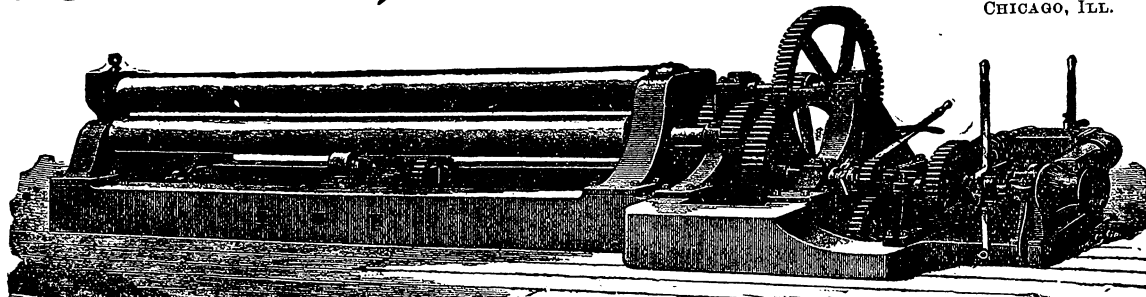
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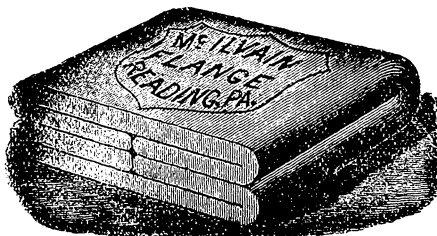
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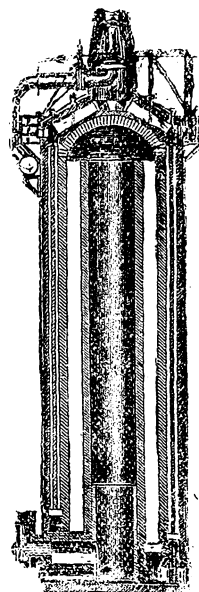
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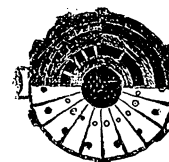
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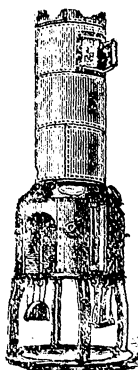
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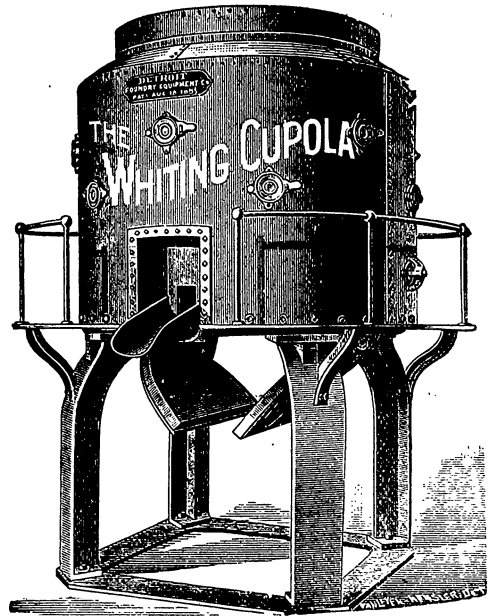
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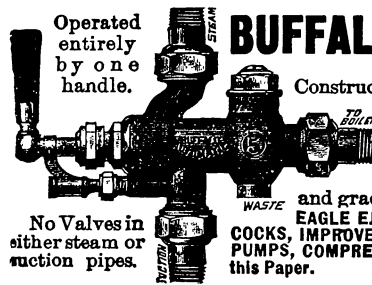
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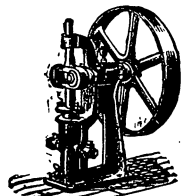
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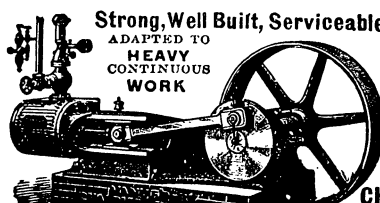
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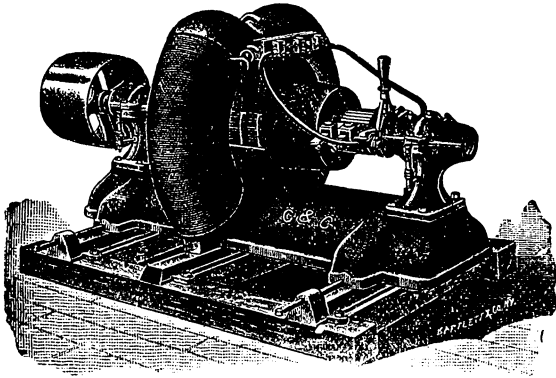
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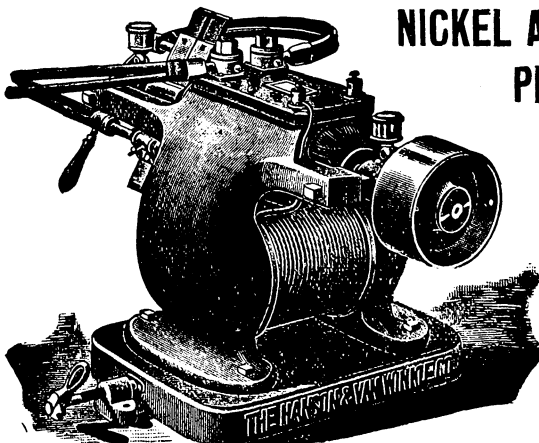
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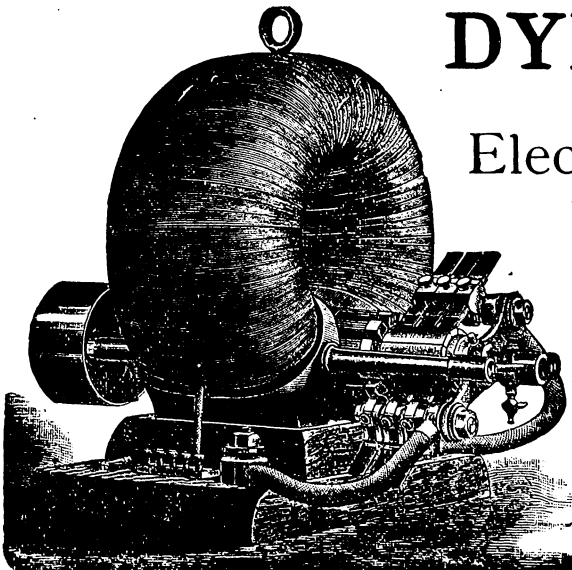
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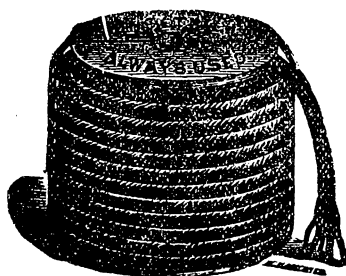
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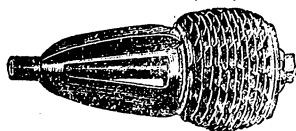


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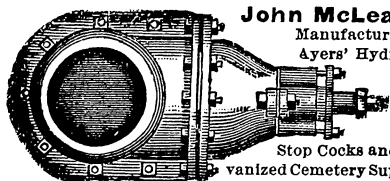


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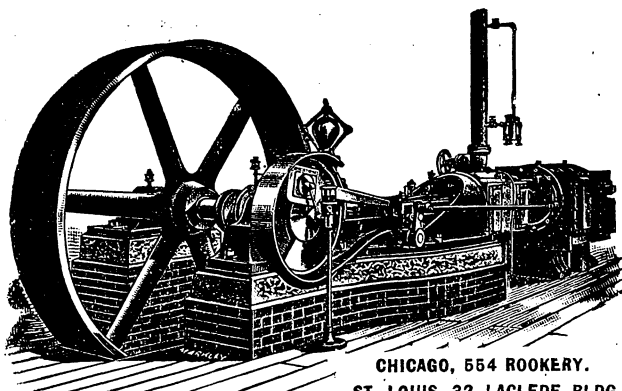
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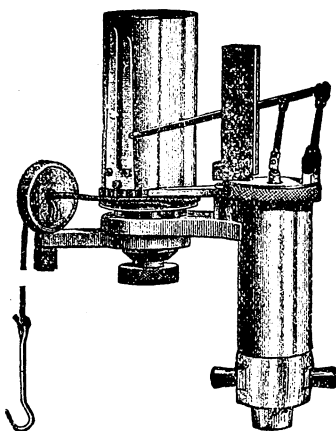
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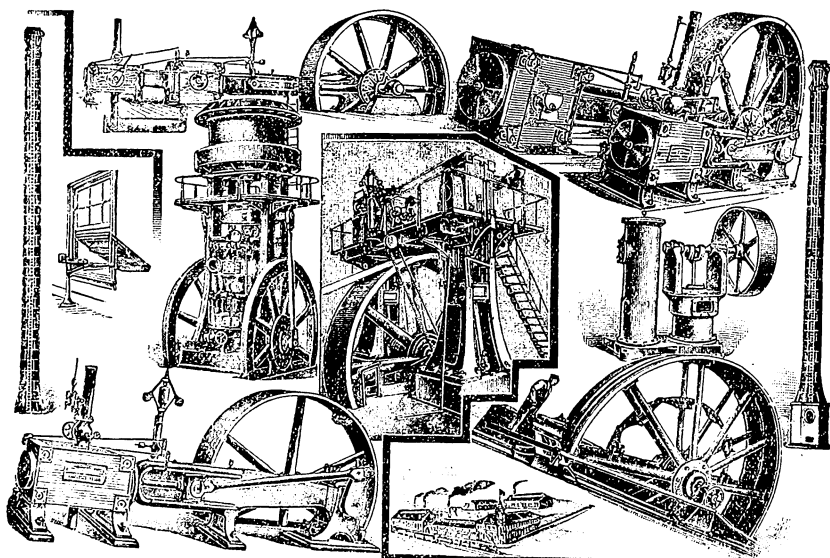
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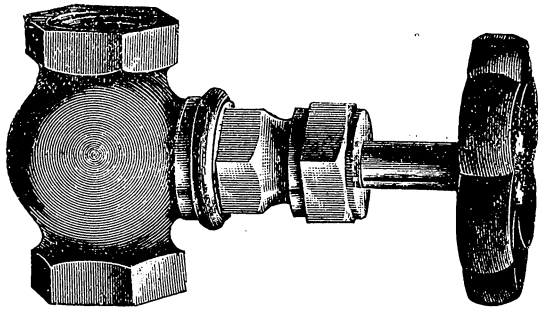
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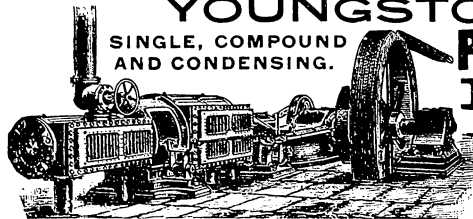
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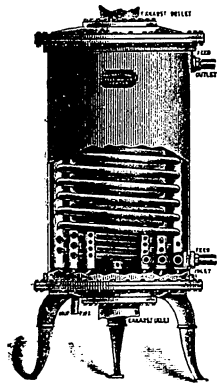
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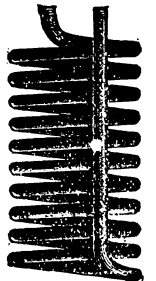


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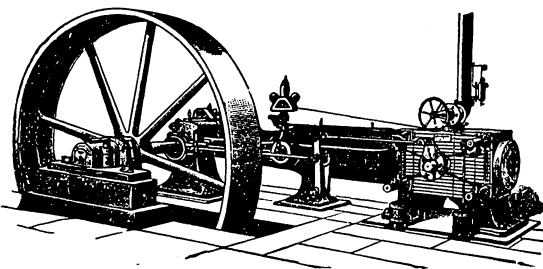
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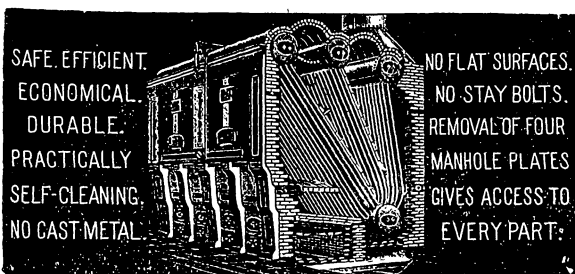
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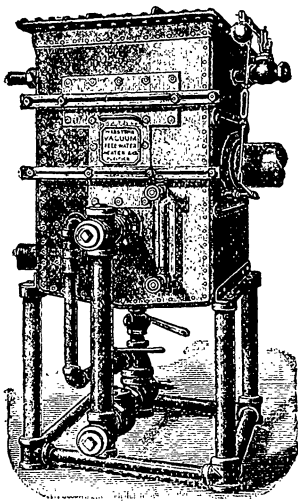
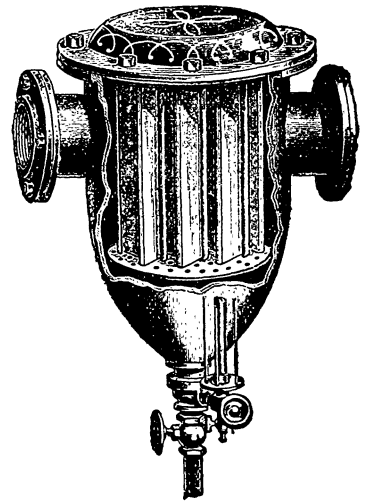
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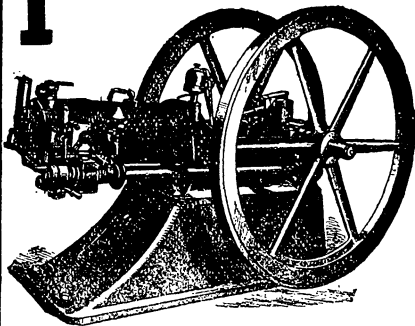
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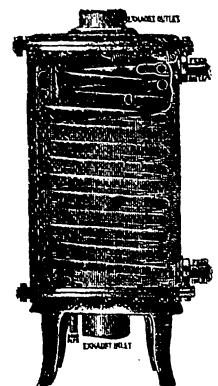
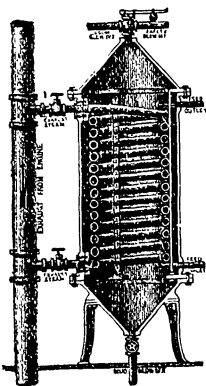
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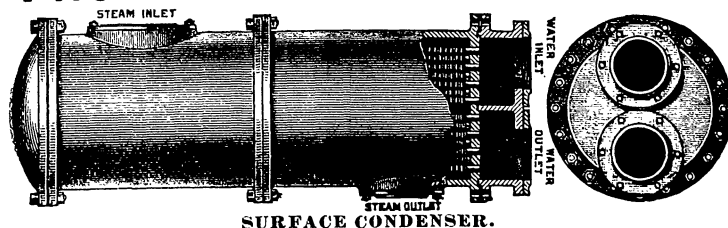
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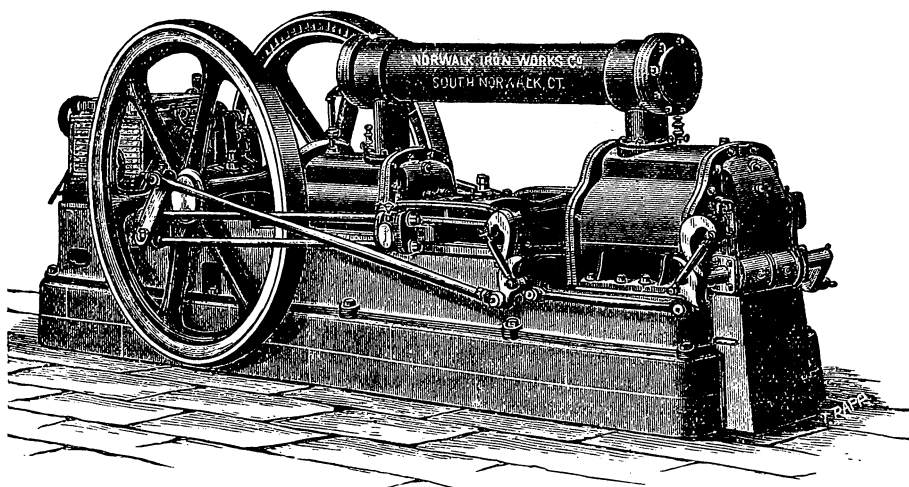
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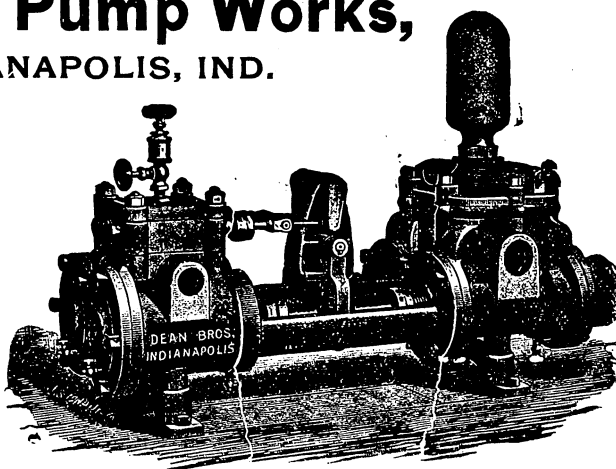
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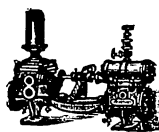


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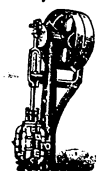
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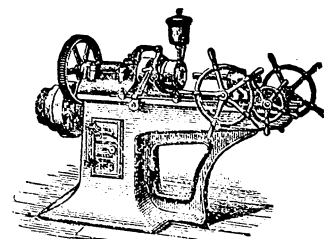
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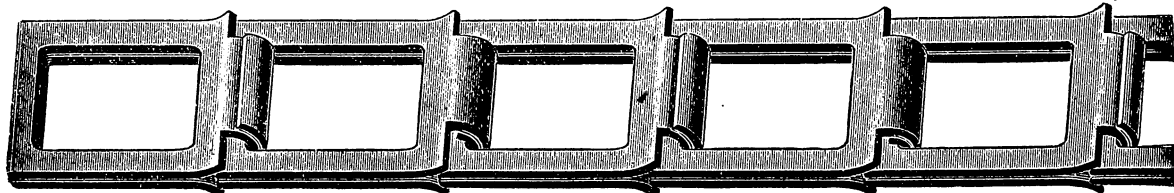
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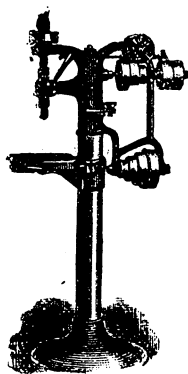
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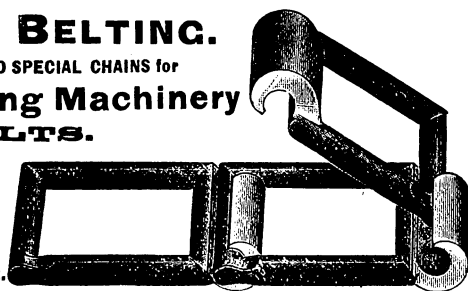
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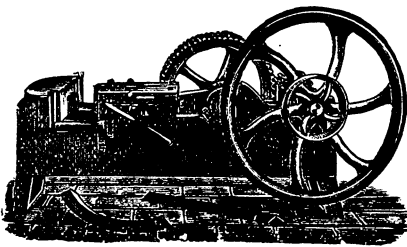
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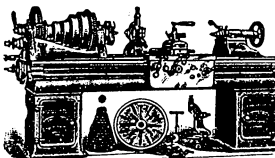
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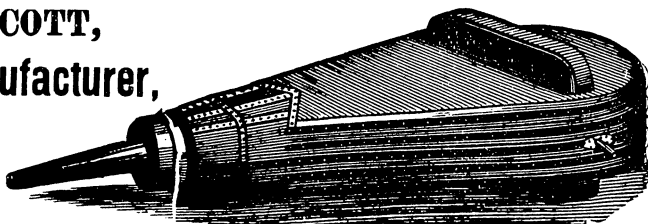
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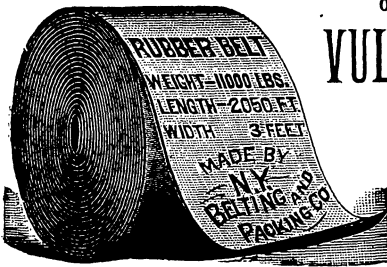
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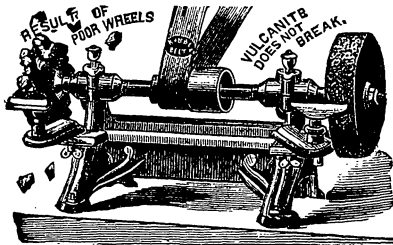
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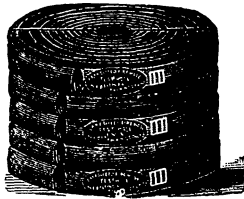
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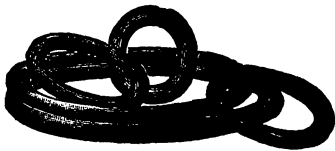
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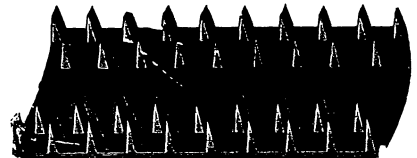
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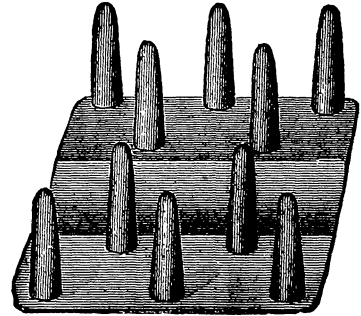


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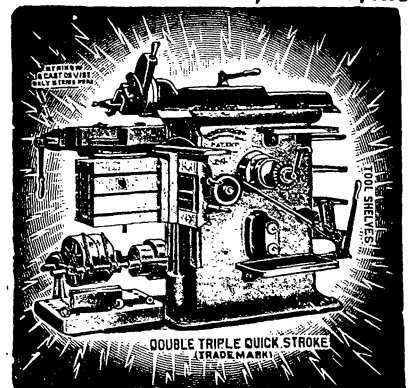
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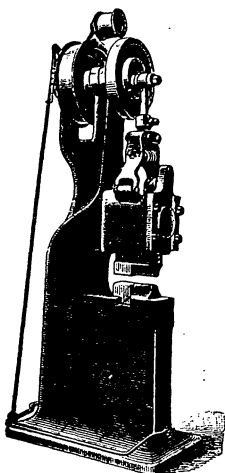
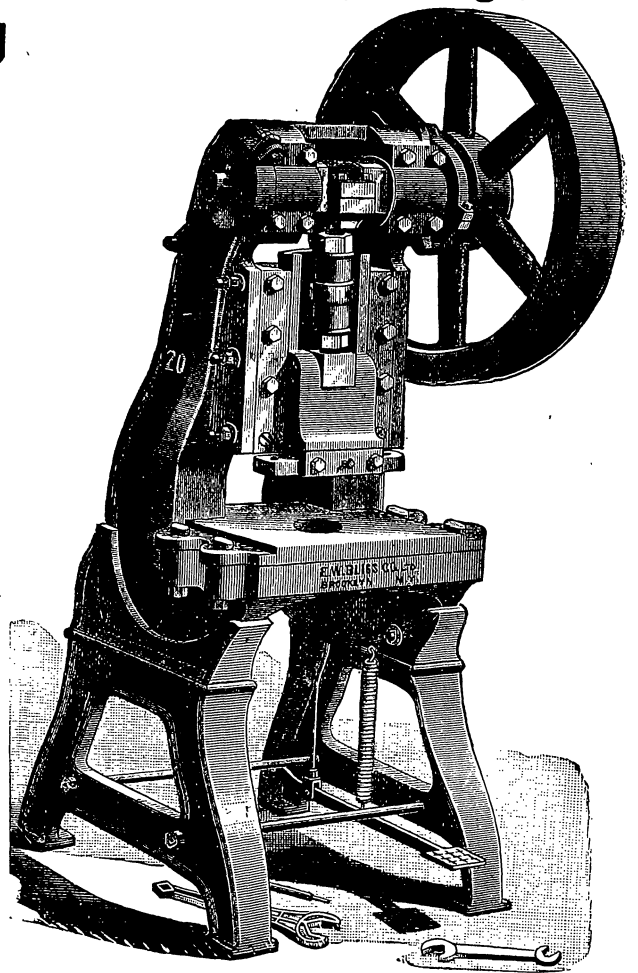
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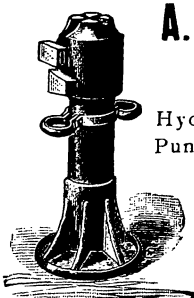
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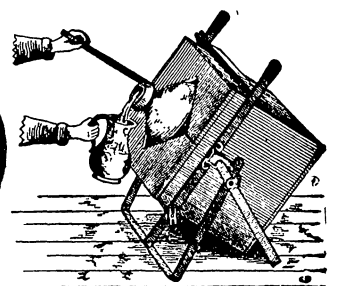
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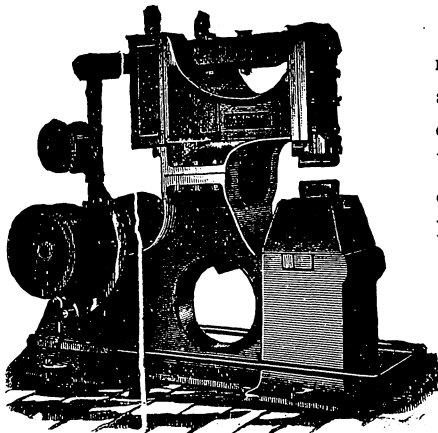
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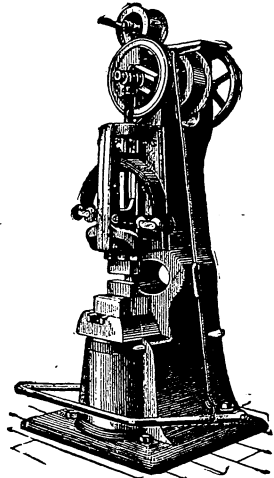
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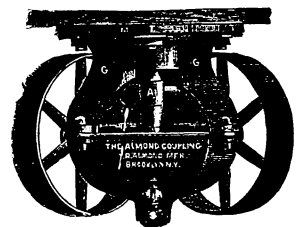
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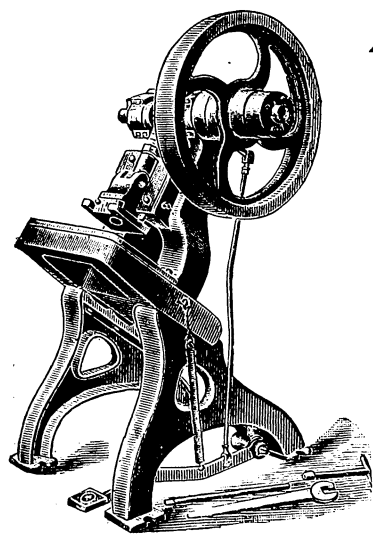
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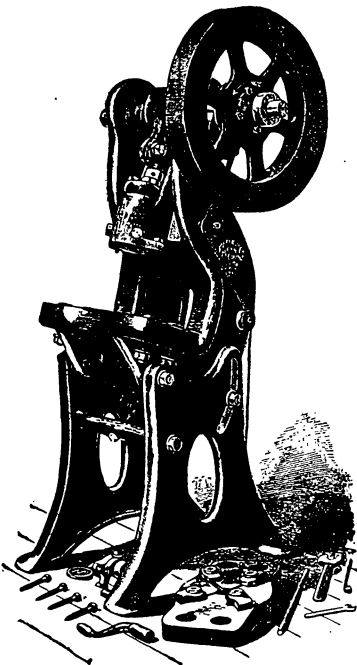
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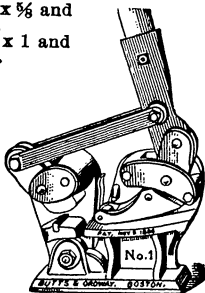
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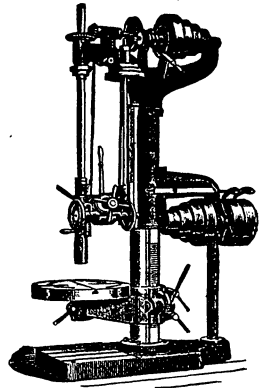
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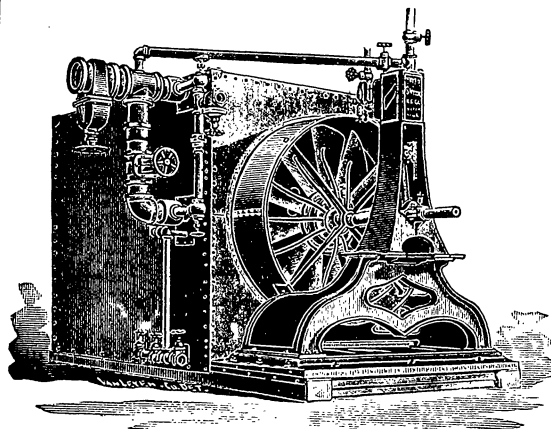
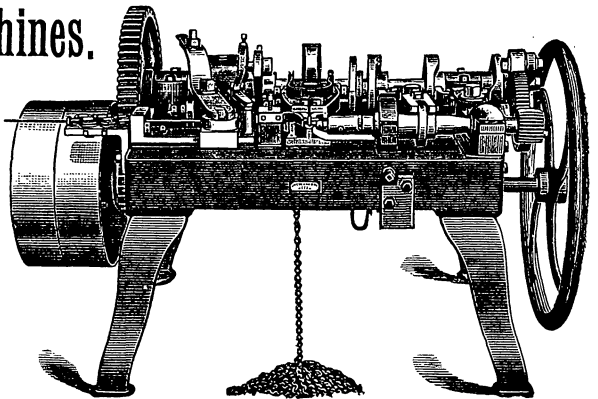
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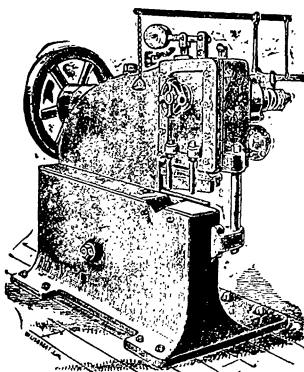
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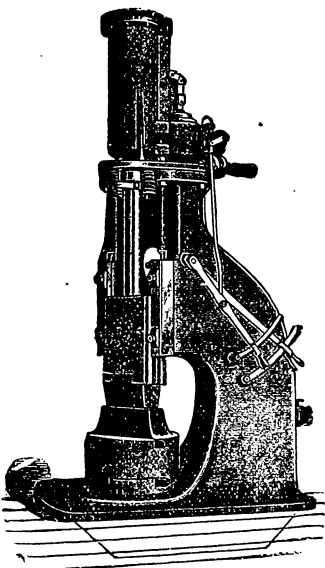
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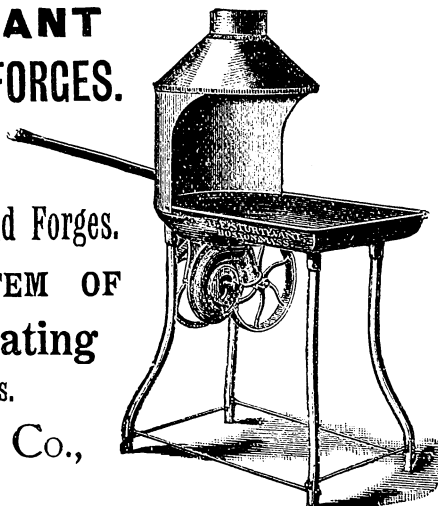
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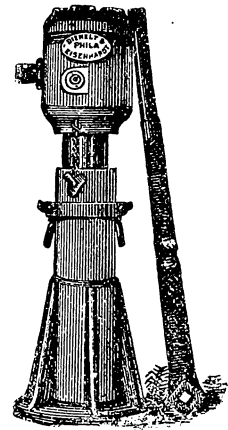
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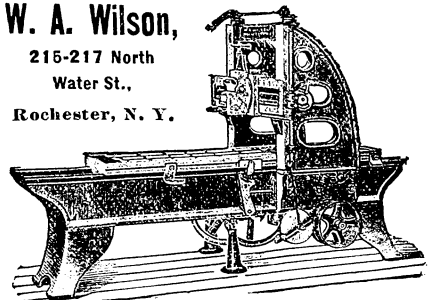
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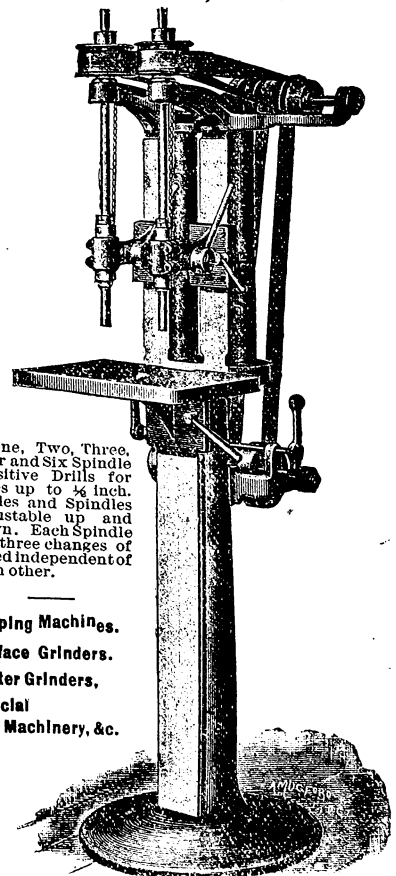
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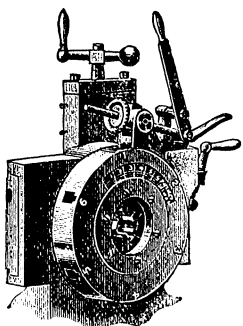
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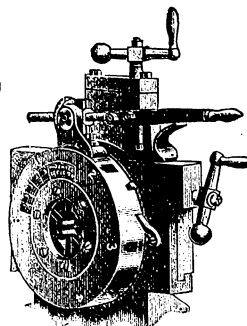
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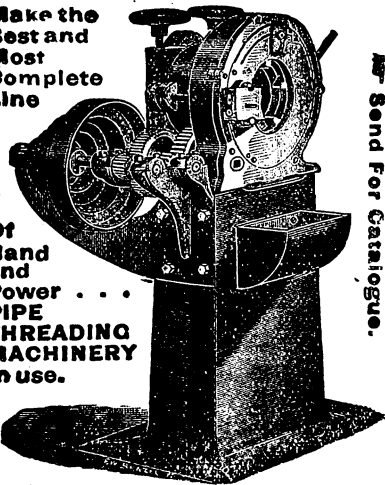


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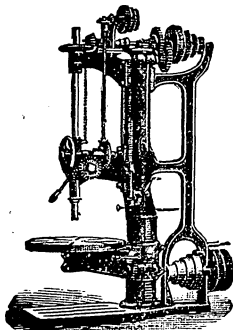
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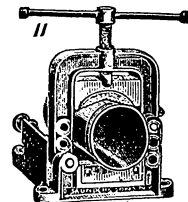
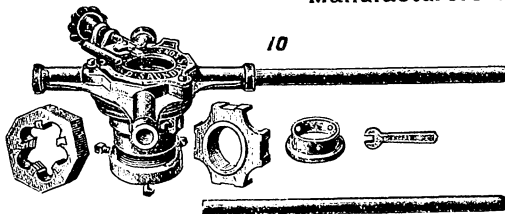
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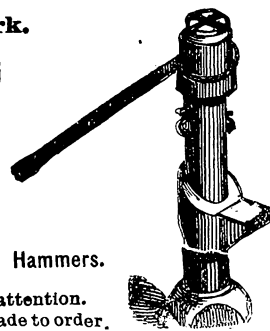
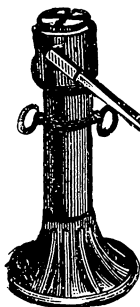
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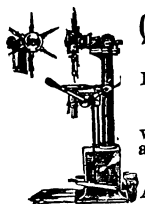
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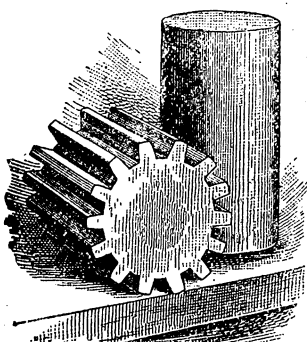
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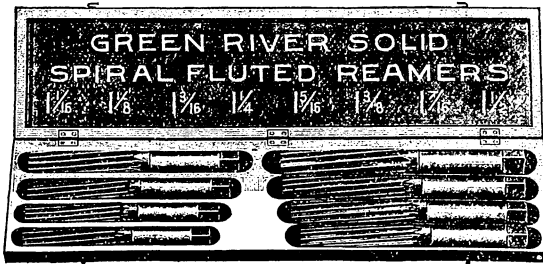


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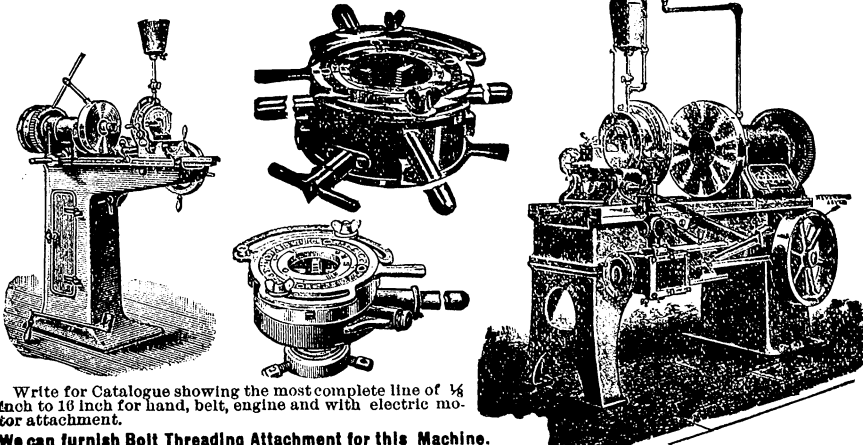
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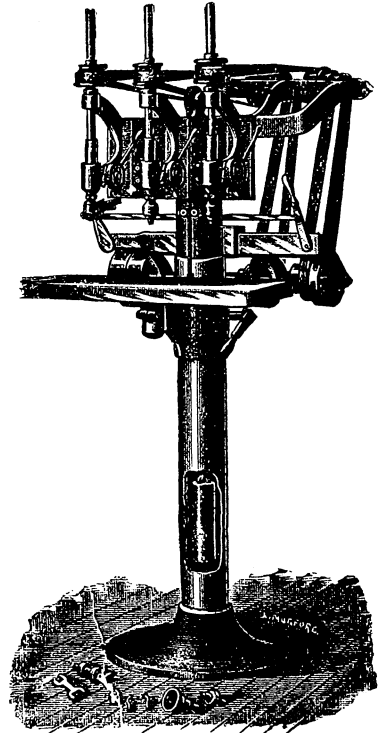


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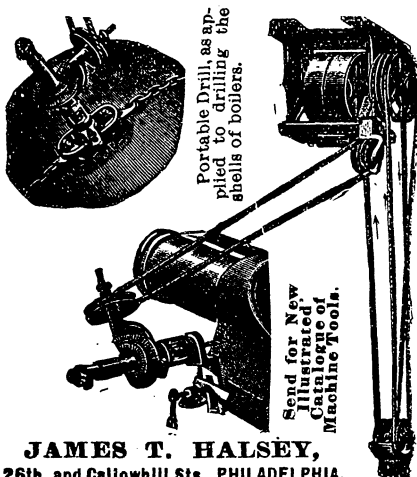
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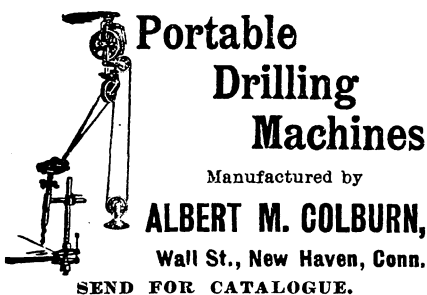
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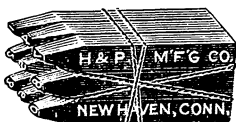
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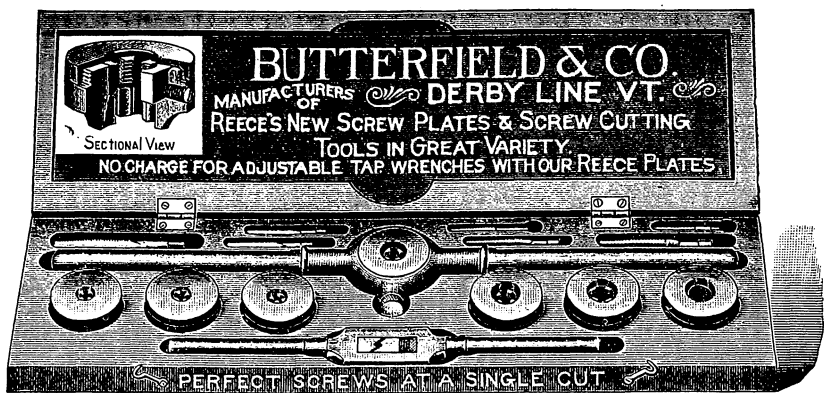
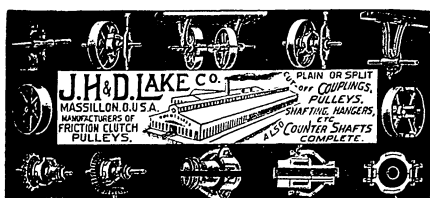
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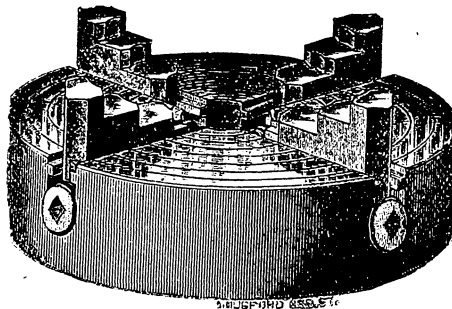
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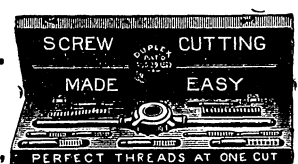
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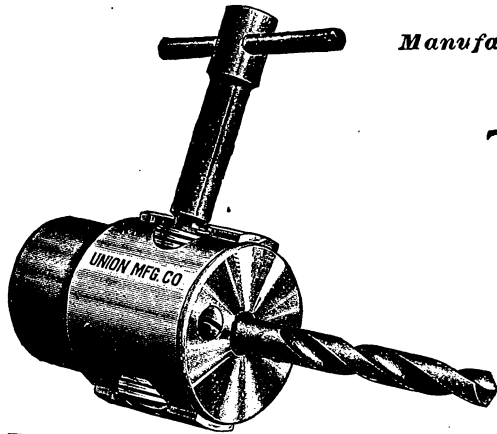
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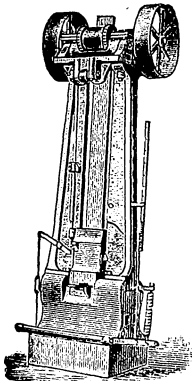
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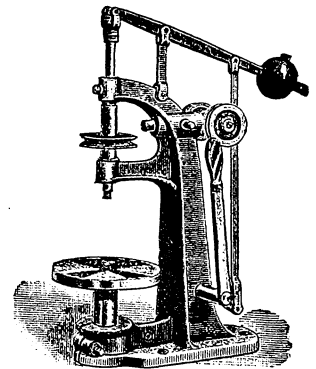
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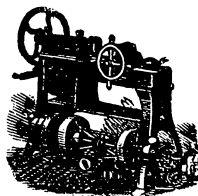


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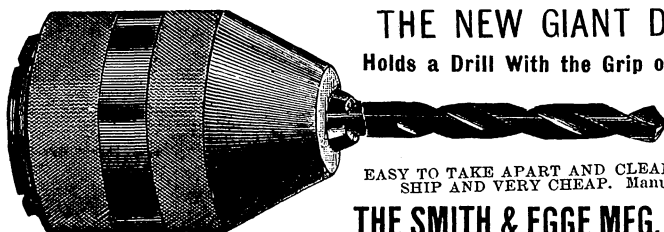
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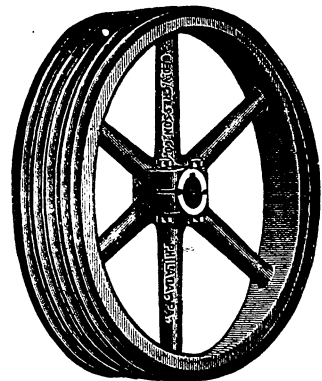
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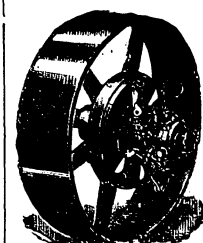
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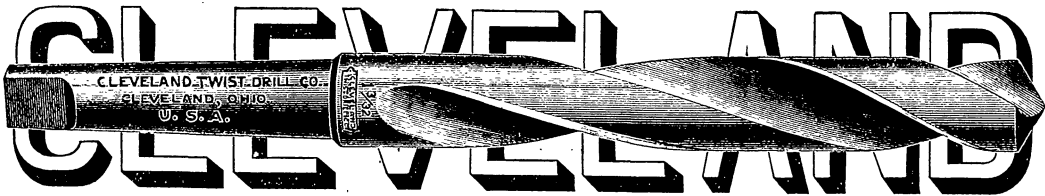
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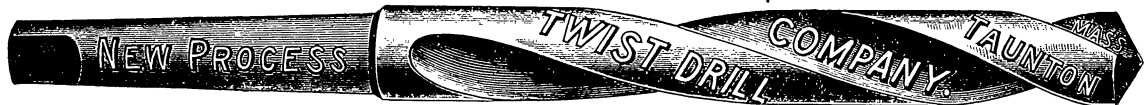
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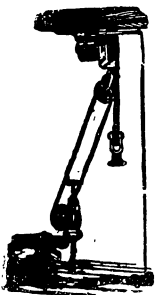
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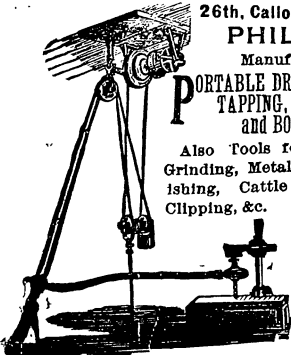
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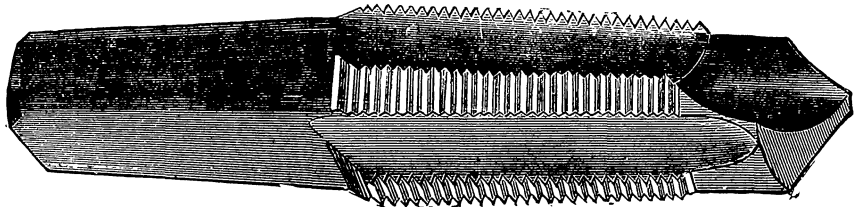
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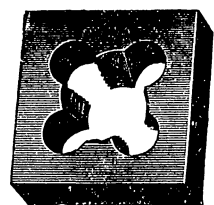
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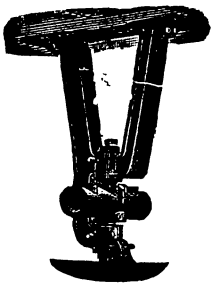
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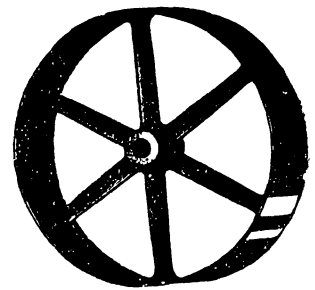
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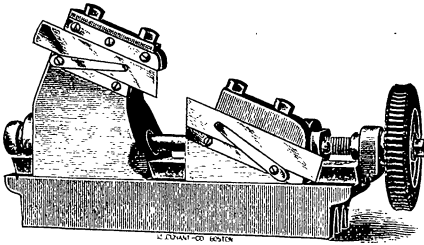
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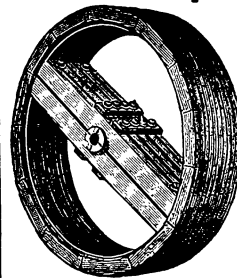


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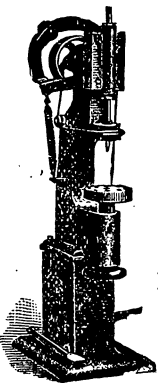
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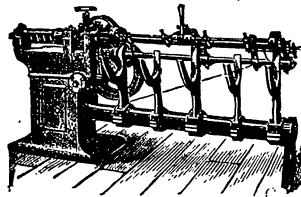
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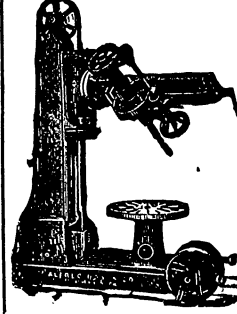
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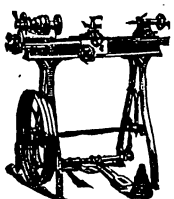
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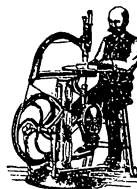
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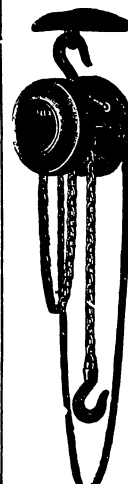
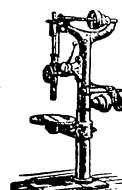


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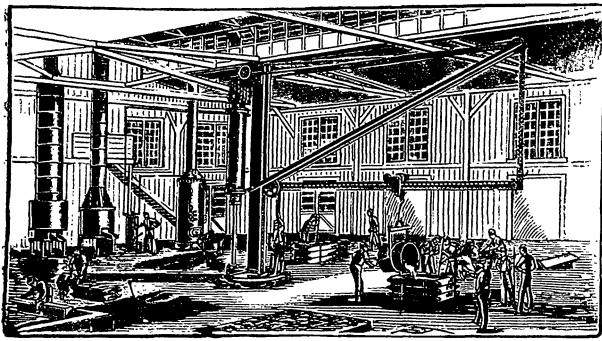
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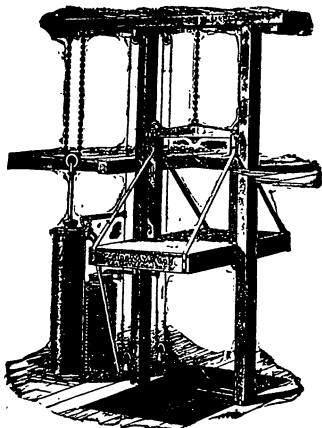
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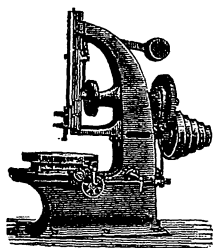
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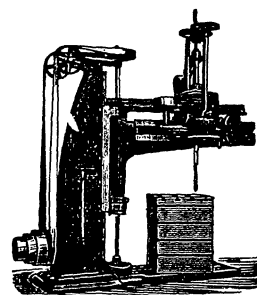
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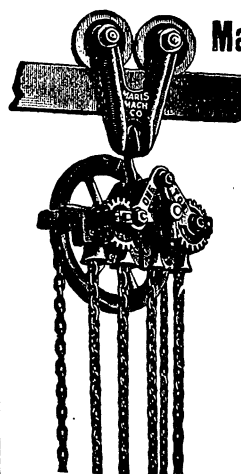
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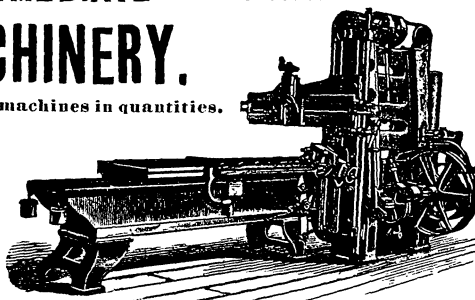
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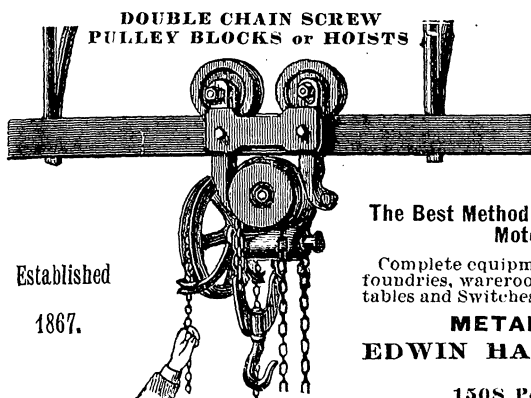
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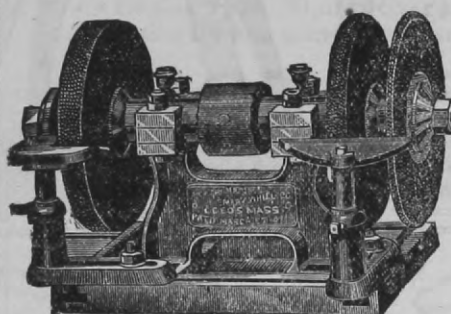
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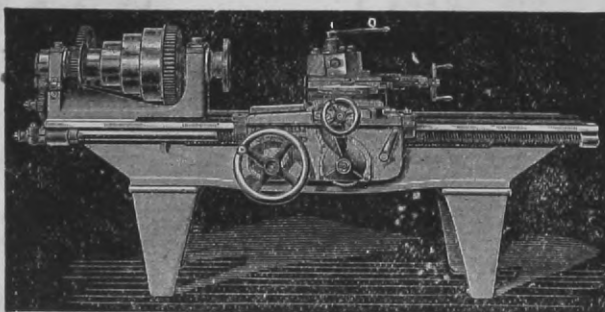


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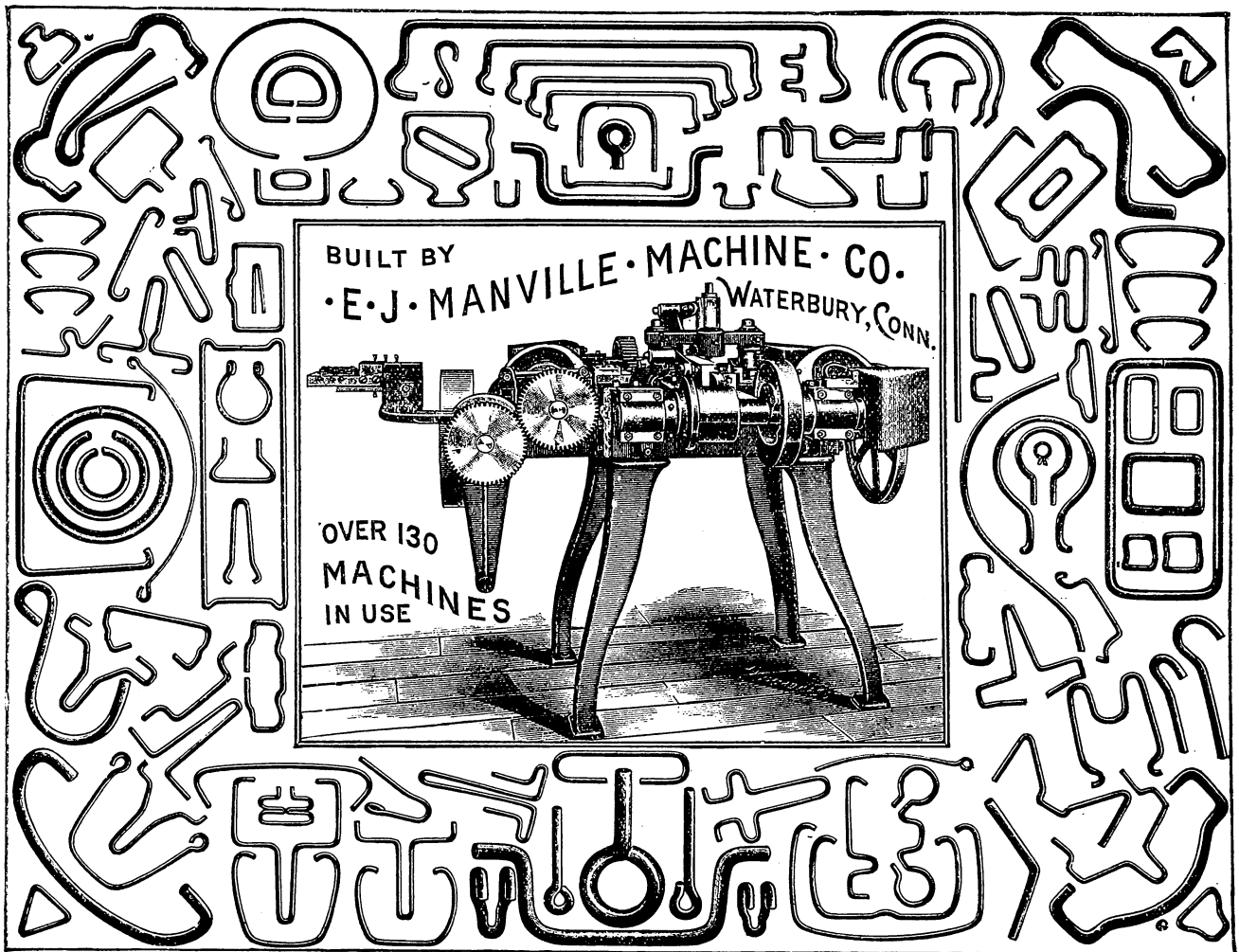
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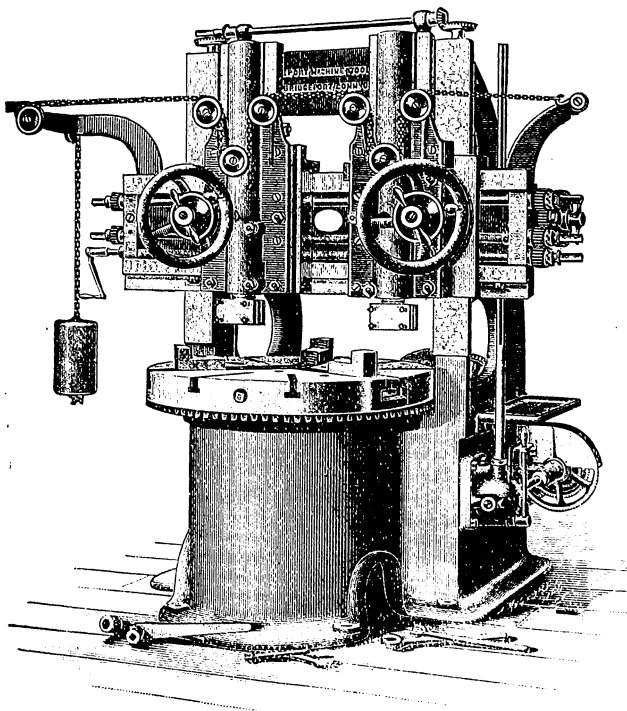
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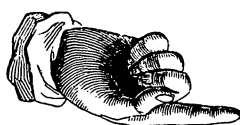
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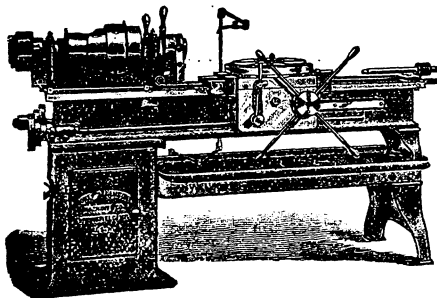
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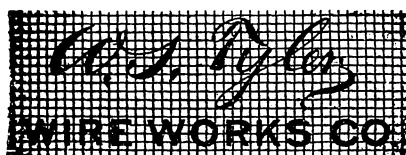
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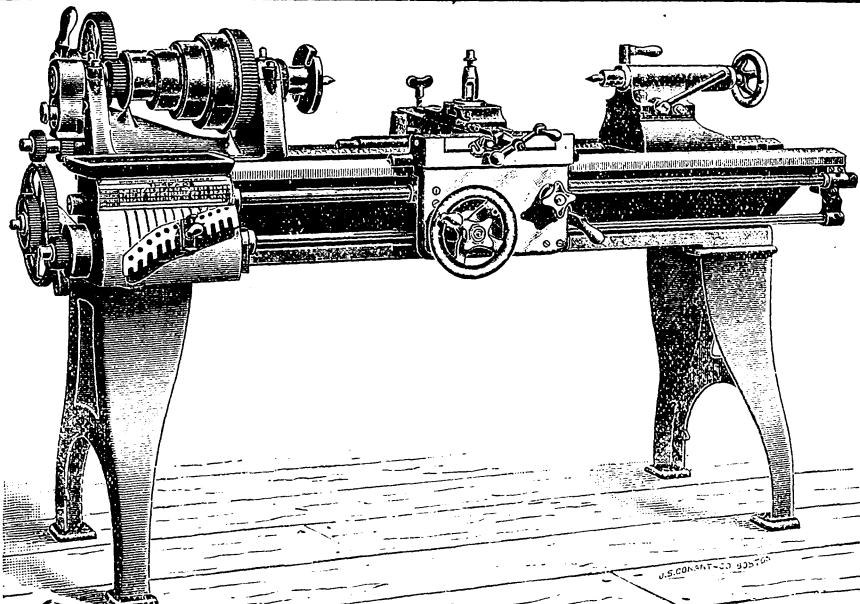
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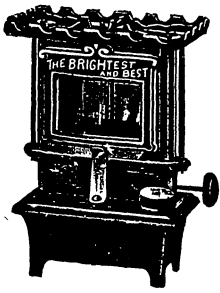
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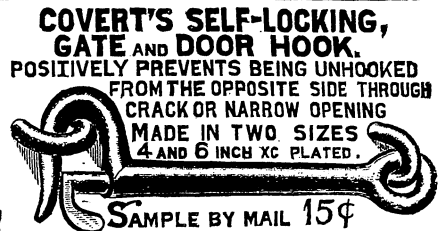


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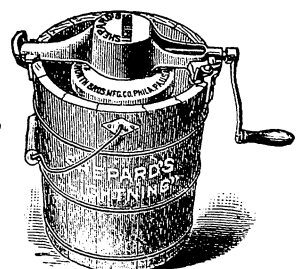
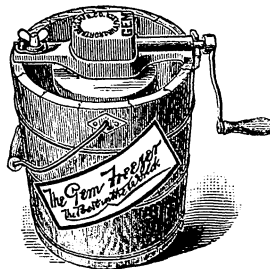
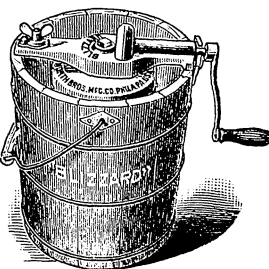
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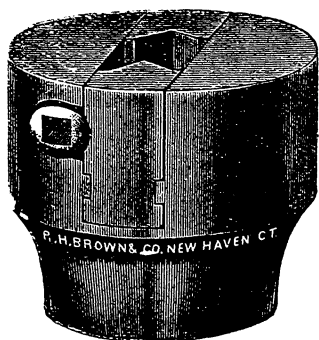
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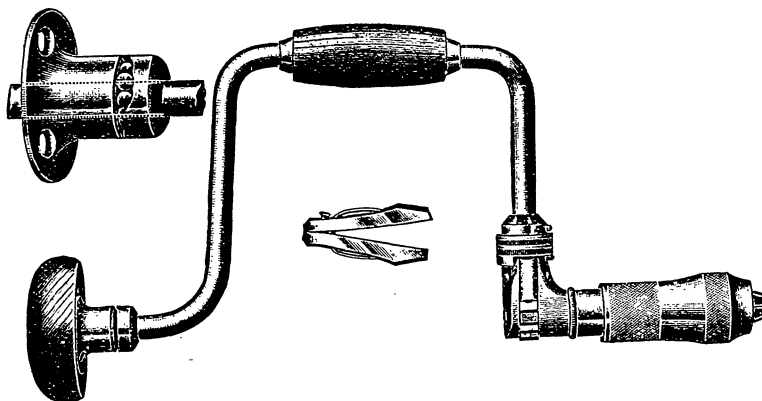


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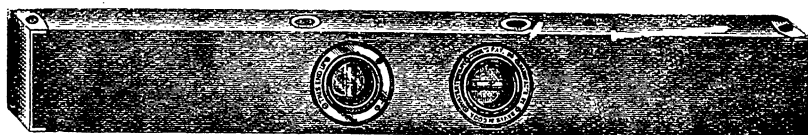
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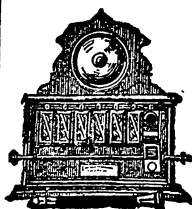


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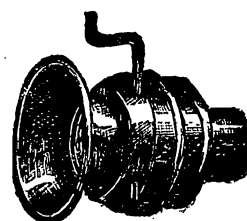


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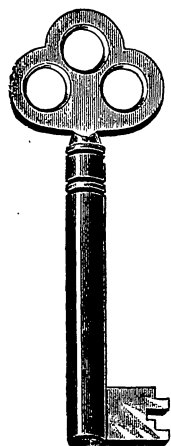
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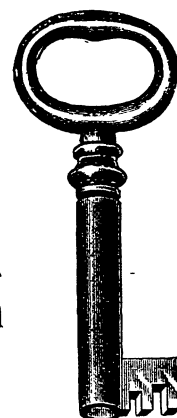
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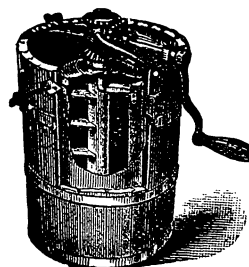
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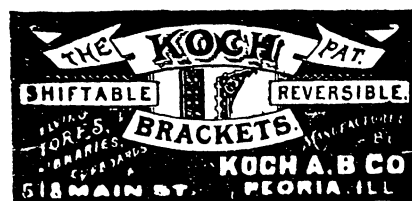
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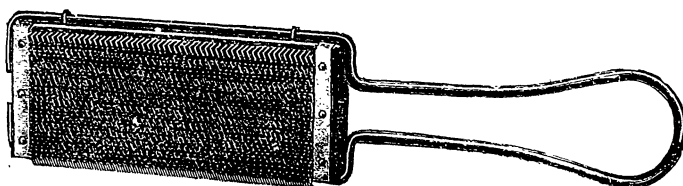
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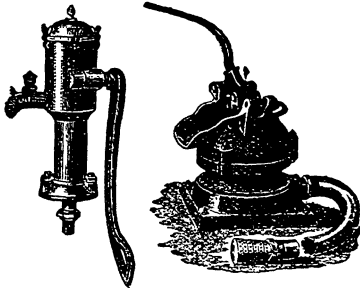
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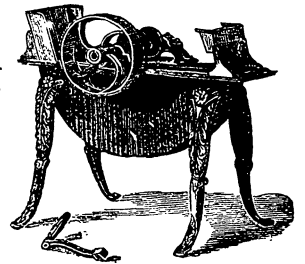
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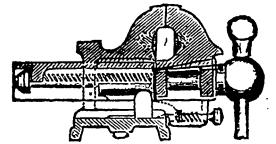
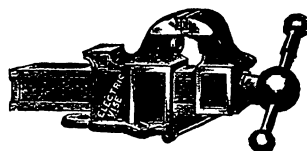
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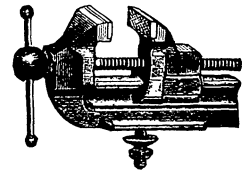
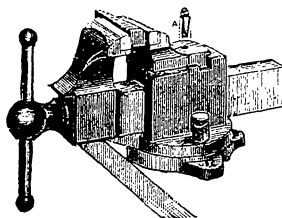
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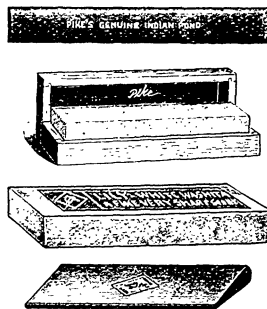
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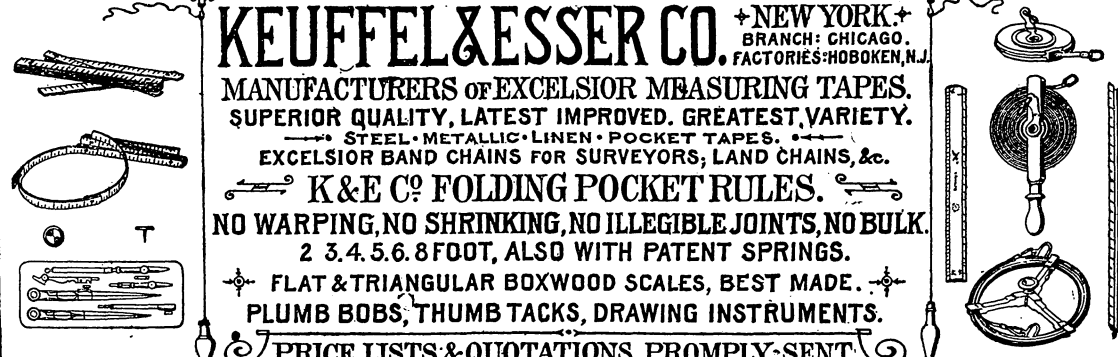
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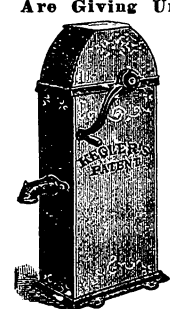
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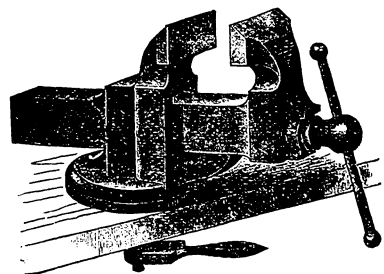
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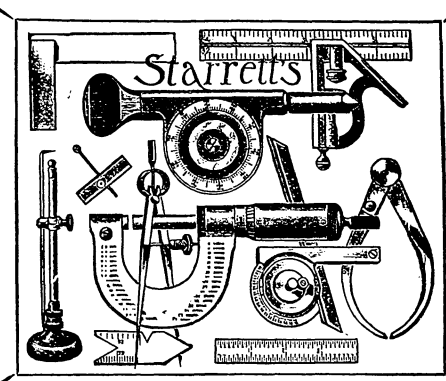
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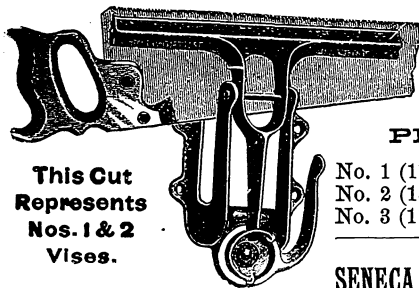
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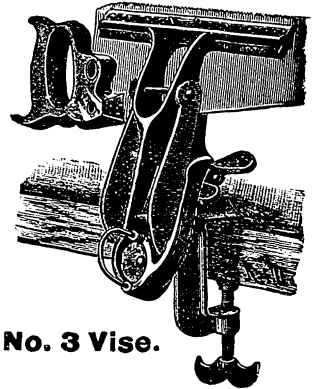
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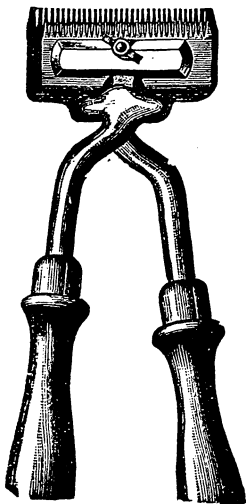
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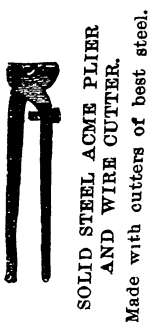
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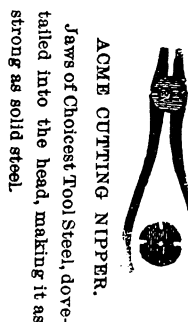
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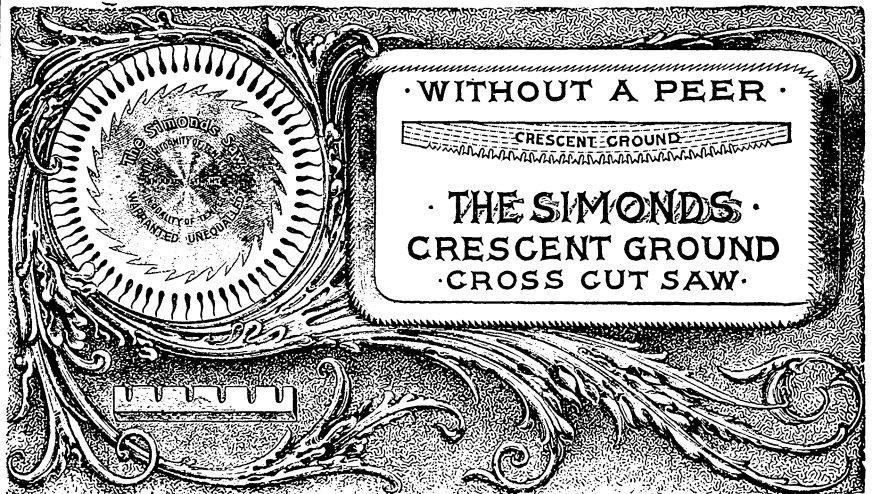
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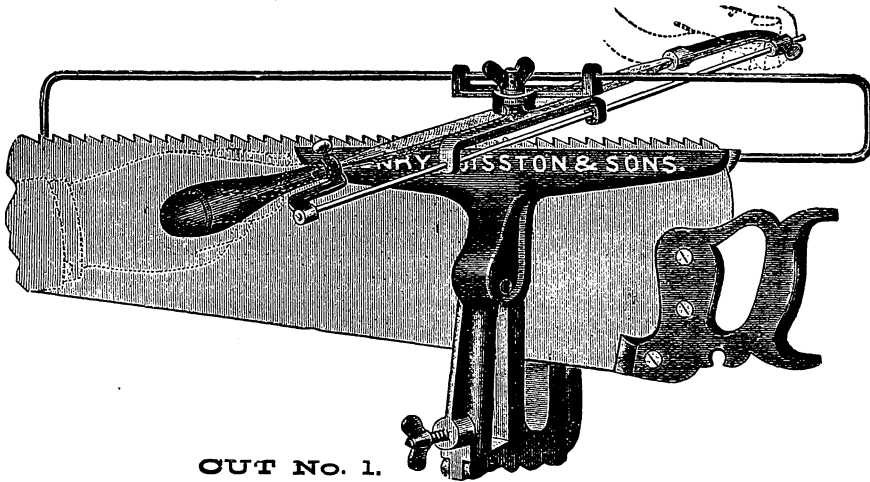
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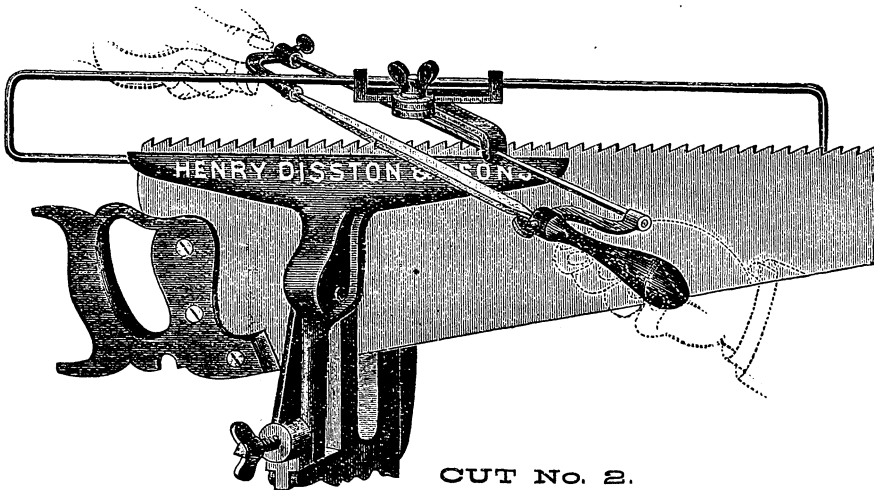
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To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

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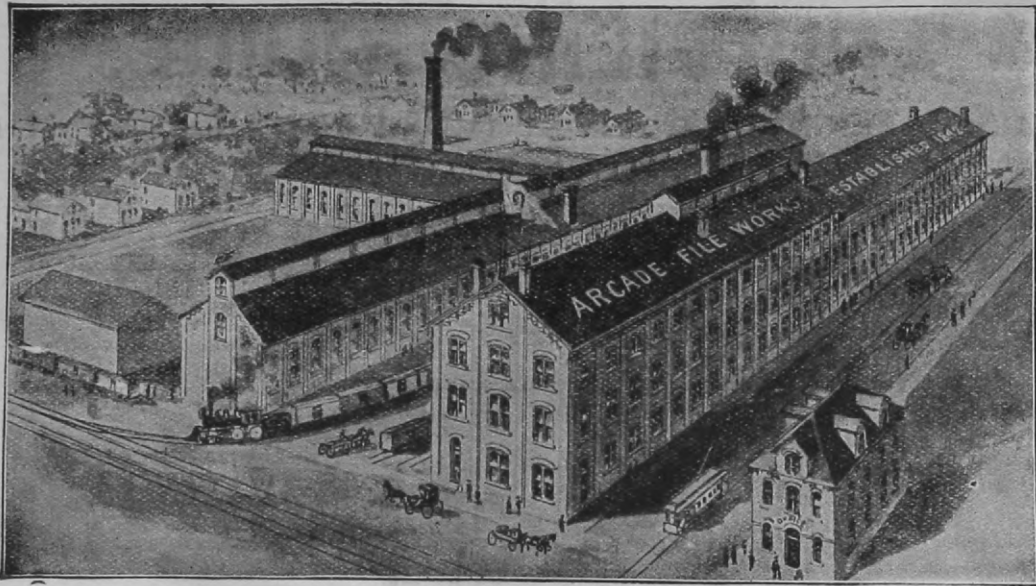
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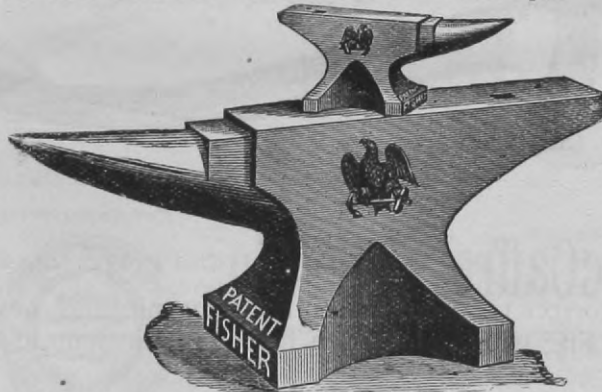
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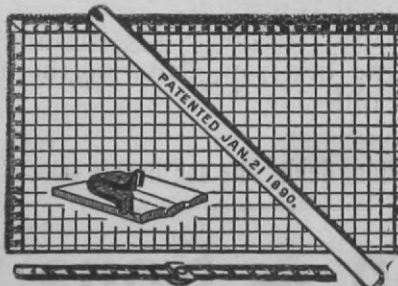
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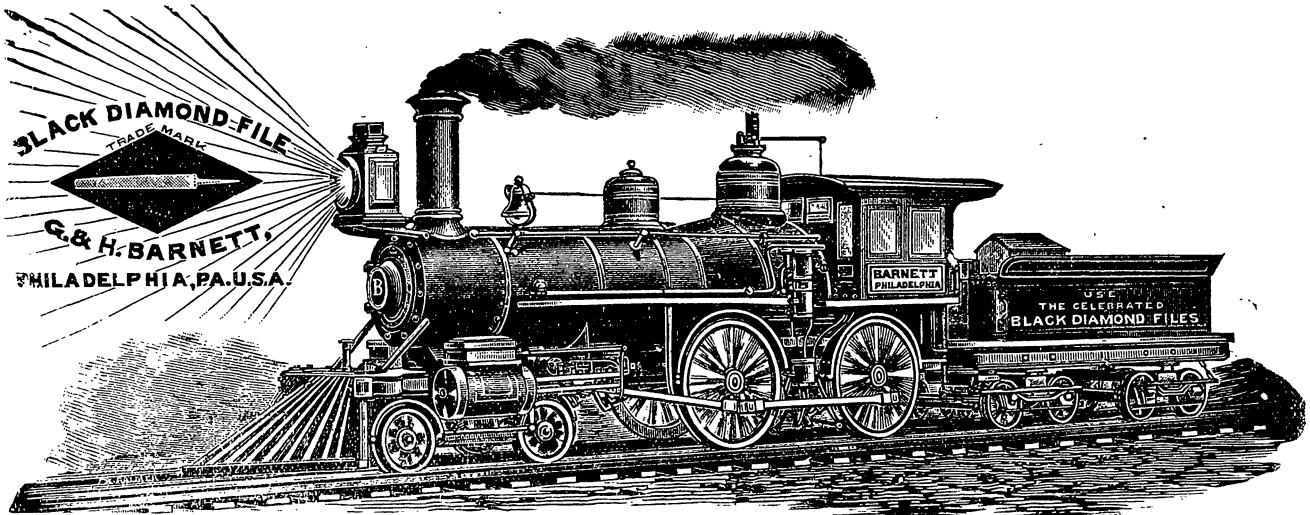
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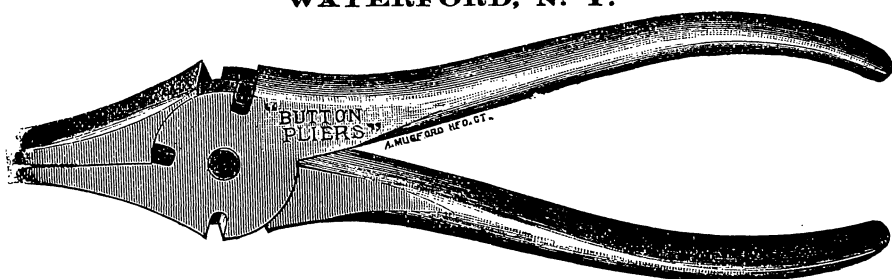
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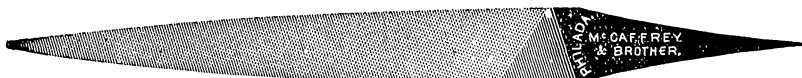
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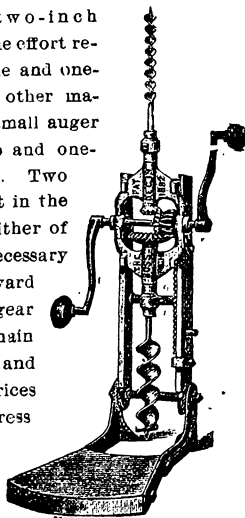
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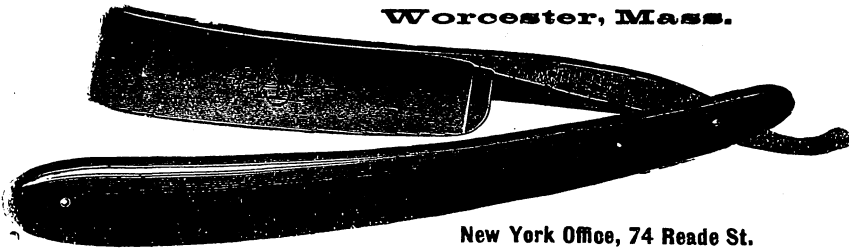
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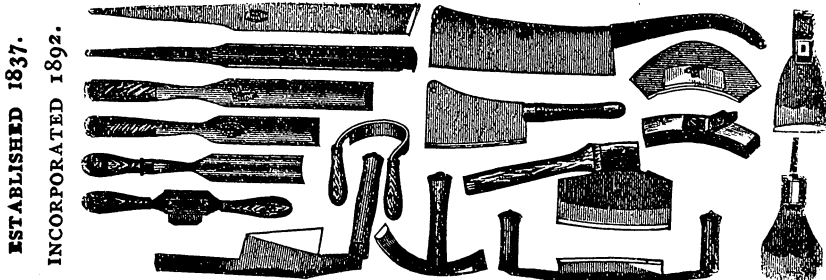


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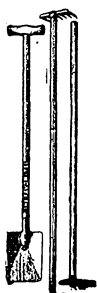


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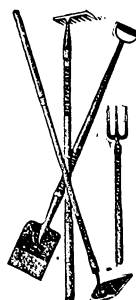
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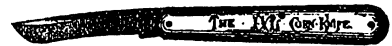
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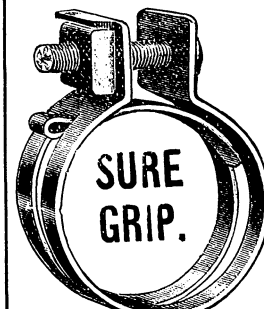
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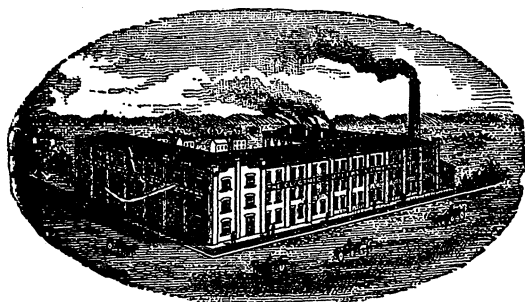
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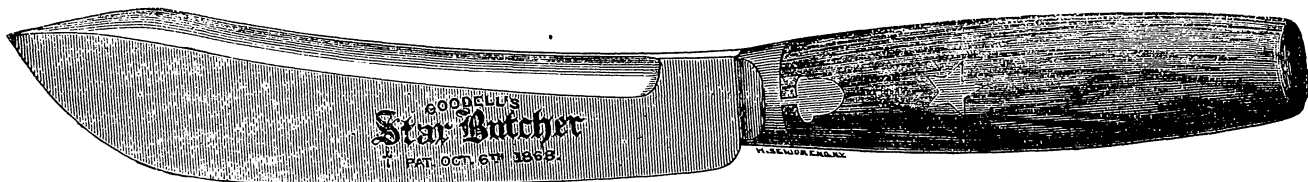
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122 Chambers
Street.

TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

Send for Revised Catalogue.

**THERE IS NOTHING NEW
TO SAY ABOUT THIS KNIFE EXCEPT
IT IS GROUND SHARP**



WE DON'T KNOW HOW TO IMPROVE IT.

Blade is made of steel especially prepared for the purpose, and it is made just right; finish excellent; shape unsurpassed; the handle just fits the hand.

GENERAL APPEARANCE IRREPROACHABLE.

Made in sizes from 5 inch to 8 inch; a strictly first-class butcher knife at a moderate price.

WE HAVE OTHER BUTCHER KNIVES,

4½ to 14 inch blade, that will cut as well, for less money. Also Table Knives and Forks, Carvers, Butcher Steels, Bread Knives, Cheese Knives, Butter Spades, Apple, Kitchen, Putty, Cigar, Shoe Knives, &c., &c., in great variety. We aim to make the best and sell at reasonable prices.

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HENRY KEIDEL & CO., Baltimore, Md.

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A TIP.—The present low price of goods is a great temptation to manufacturers to cut the quality. My "Anchor Brand" Hatchets and Hammers have EXTRA all WHITE Handles in them. Some of the cheaper goods now offered—but not sold—have No. 1 and in some cases No. 2 handles in them.

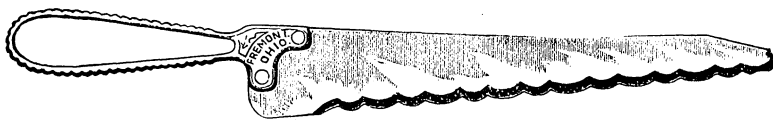
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(SCISSORS),

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CUTLERY

Will mark price &c., on cutlery.

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Guaranteed not to rust.

Flows from Pen as readily as ink.

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Are Reliable.

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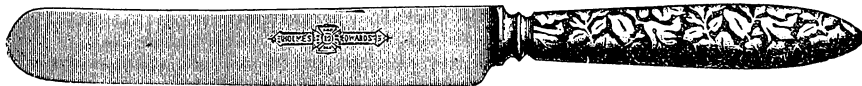
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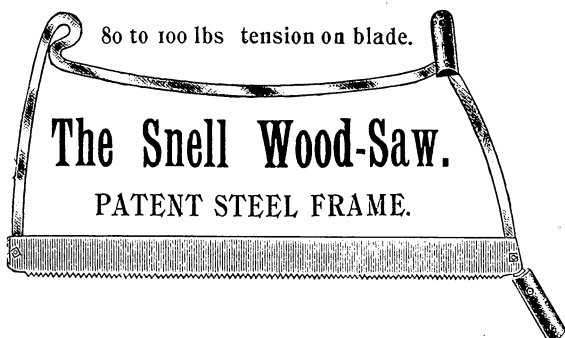
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Full 12 dwt. Stamped our name and trade-mark.



80 to 100 lbs tension on blade.

Will do work faster
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Will last a life-time.

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FACTORY, 330 to 338 First Street, So. Boston.

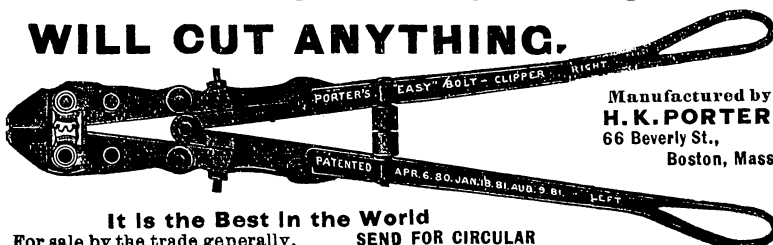
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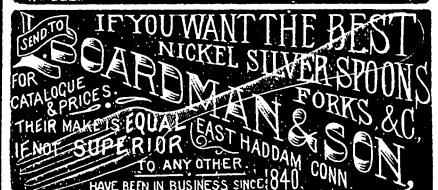
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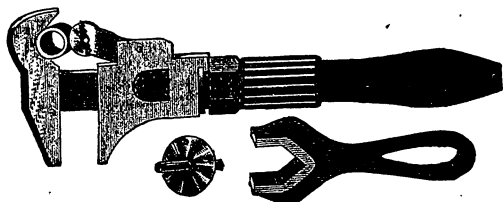
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WE MAKE ONLY

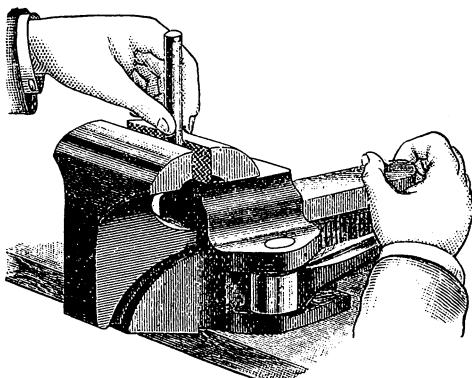
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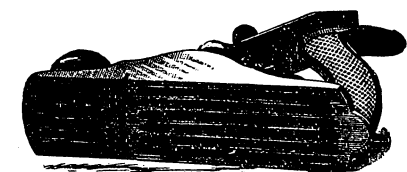
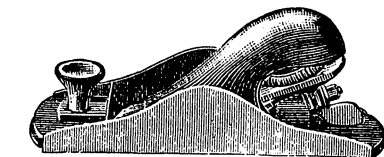
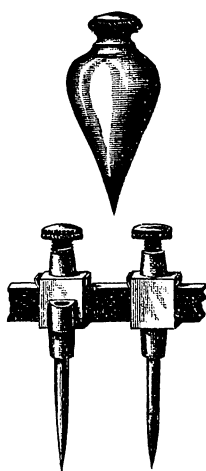
HIGH QUALITY TOOLS



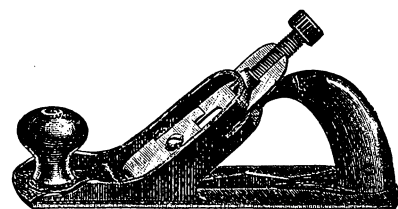
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Short or Long Sleeve Nuts, and
with Pipe Cutter.



Stephens' Patent Vises, Quick Adjust-
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Corrugated Bottoms,
Checkered Rubber
Handles.



Challenge Iron Planes.
Simplicity of Construction.

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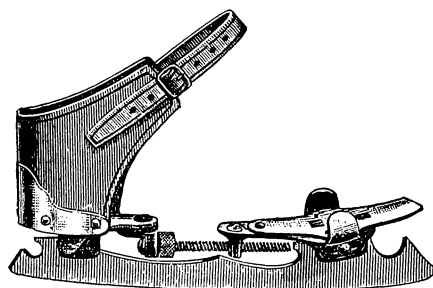
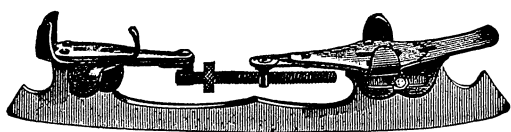
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

ICE SKATES

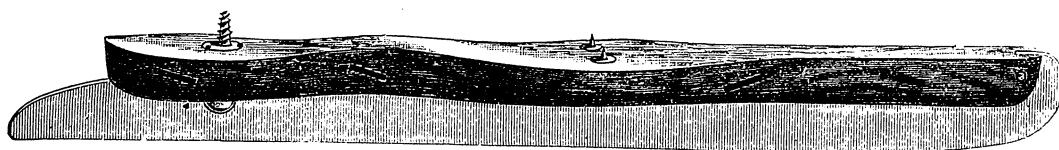
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DONOGHUE RACING SKATE.



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Highest possible grade in every respect at moderate prices—\$90.00, \$100.00, \$125.00.

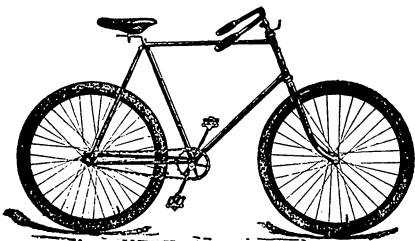
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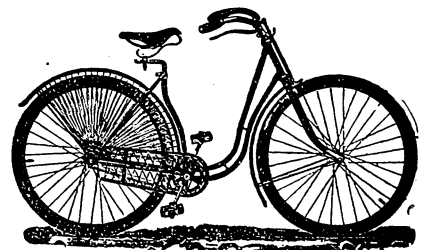


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Genl. Eastern Distributing and Sales Agents.



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The King of '94.

Warranted equal to any Bicycle made in America, Regardless of Price.

All the Modern Improvements up to Date in Every Respect.

5½ inch tread, straight rear forks, all parts interchangeable, fitted with the Waverley clincher tire, made under Gormully and Jeffreys' patents by an entirely new and vastly superior process patented by ourselves, Scorecher pattern.

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OUR
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Double Action in 32, 38 & 44 Cal.

H. & R. Imp. Ejecting Double Action,

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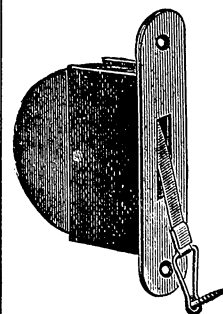
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as the most durable device ever invented for counter balancing the weight of sash.

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Can be used in old as well as new houses. Warranted 15 years.

Write for Illustrated Price-List.



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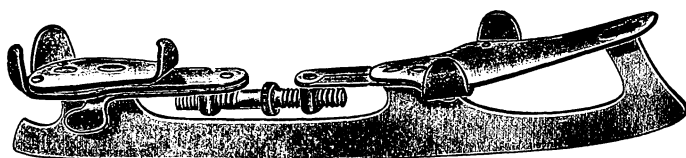
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The most extensive Skate Factory in the World.

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IRON BENCH LEVEL

WITH DOUBLE PLUMB.

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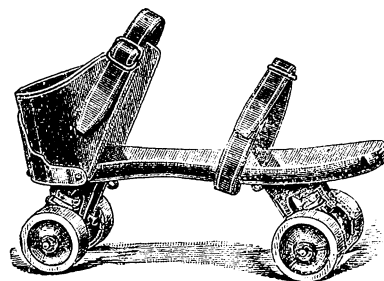


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THE "OHIO"

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STIRS FROM THE BOTTOM.

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NEVER TURNS BACK.

Has all the Good Points.
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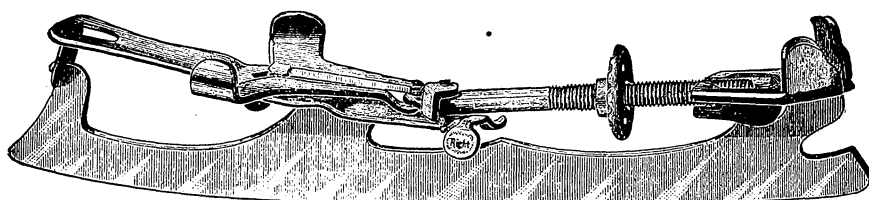
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WHEN A GOOD FREEZER IS NOT WANTED.

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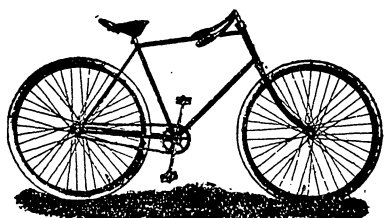


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YOUR SKATES WILL NOT RUST —IF YOU USE— PARAVASELINE.

It is a Lubricant that will prevent all kinds of metals from rusting.
WHEN YOU COME HOME AFTER SKATING
apply a light coat of Paravaseline to your skates and it will keep them in good condition.
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Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

Carry Stock of Jackson, Mich., Farming Tools

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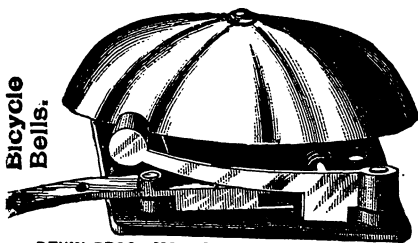


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Especially Low Prices.

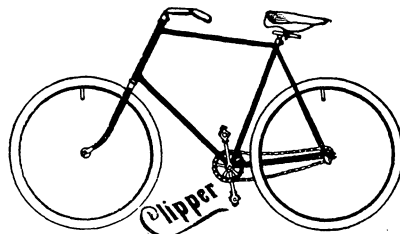
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Are you in the bicycle business? If not, you can make it pay to handle Clippers. Buy direct from the manufacturer and save the jobbers' profit. It will add considerable to your bank account. We want responsible dealers only. We may be able to interest you, in fact we are sure of it. Our policy is a protective one, and will please you. It protects against Scalpers and "Curb Stone Brokers."

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Every Year

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A wonderful, strong, light wheel, with a dozen points of superiority over all others. Our "new departure" catalogue (free) tells all about it.

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FOR
GASOLINE
OR
OIL.

14 JETS OF LIGHT

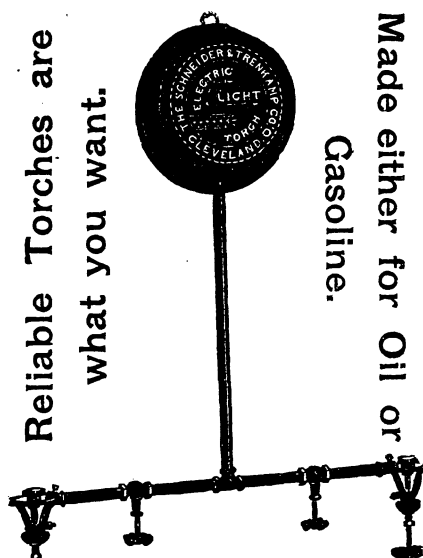


3 to 6
INCHES
LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
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These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner. Write us for prices. A liberal discount given to the trade. Manufactured by **THE SCHNEIDER & TRENKAMP CO.,** Nos. 479 to 497 Case Ave., Cleveland, Ohio.

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FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

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PATENTED IN ALL COUNTRIES.



SHOWING REEL HUNG UP READY FOR USE.

SIX PATENTS

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AGAINST

Hugh De Haven,

Proprietor of De Haven Mfg Co.,
AND OTHERS.

Injunction Notice.

**The U. S. Court says in
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Cary Manufacturing Co.,
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LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do double work.

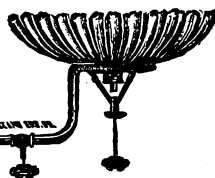


The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving **PERFECT SATISFACTION**, as is evidenced by the **DUPLICATE ORDERS** we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.



Price, for Single Torch, complete, \$2 each.

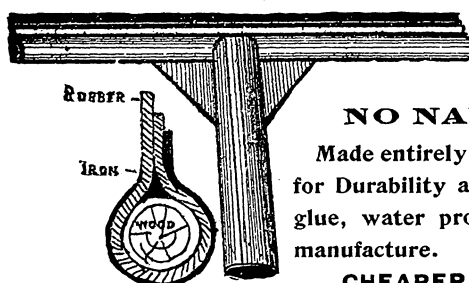
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Patented January 4th, 1887.



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Nonpareil Window Cleaner.

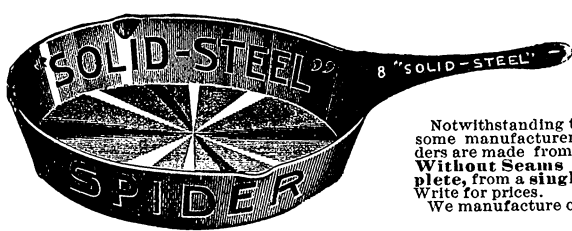
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Made entirely of Galvanized Iron and is Unexcelled for Durability and Simplicity of Construction. No glue, water proof cement or shellac used in its manufacture.

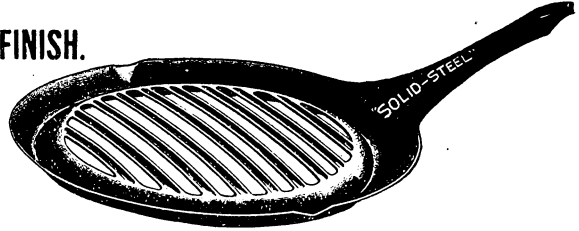
**CHEAPER than the CHEAPEST,
BETTER than the BEST.**

For prices on this and other specialties address

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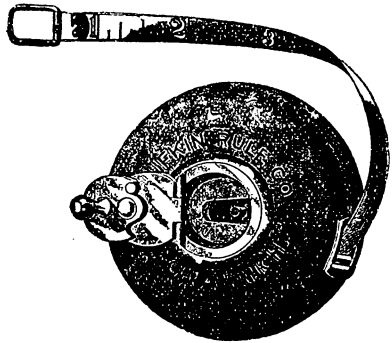
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Notwithstanding the claims made by some manufacturers' agents our spiders are made from Wrought Steel. Without Seams or Rivets. Complete, from a single piece of metal. Write for prices. We manufacture our own goods.



No Seams, no Rivets in "Solid-Steel" Ware.

Made without Seams or Rivets.

The Cleveland Stamping & Tool Co., Cleveland, O.**We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.****"RELIABLE"
Steel Measuring Tapes.**

Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval. We carry a complete stock of our goods at our New York Office, 20 Murray St.

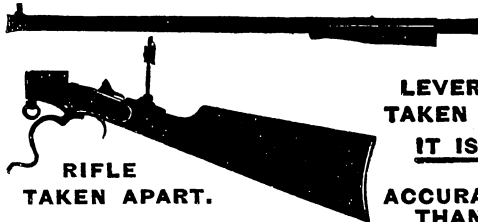
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STEVENS' "FAVORITE" RIFLE.**

10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.



.25 STEVENS

ABOVE TARGETS
ARE
ACTUAL SIZE.

Made for the 22 or 25 Rim Fire Cartridge.

RIFLE
TAKEN APART.

WEIGHT, 4 1/2 POUNDS.
22-INCH BARREL.
LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.
**IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.**

- No. 17. Plain Open Sights.....\$12.50
No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00
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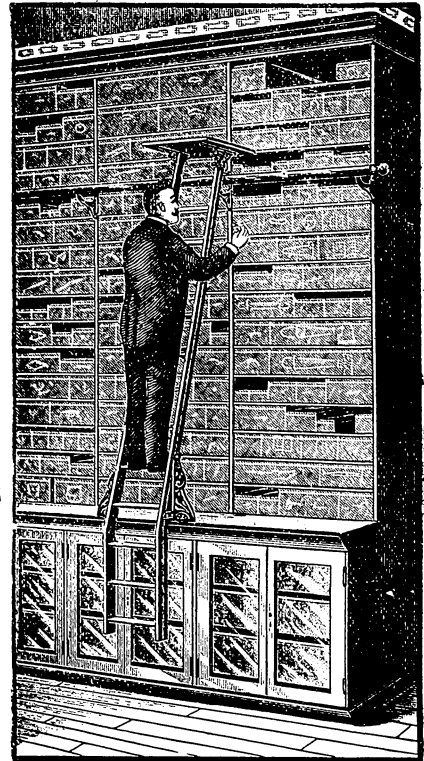
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**THE BICYCLE STEP LADDER.**

Highest Award, Columbian Exposition.
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made.
Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

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Manufacturers of Sheets, Medals, Utensils.

**IT DON'T
PAY**

to buy old style
plain bearing
Tricycles when
you can buy the

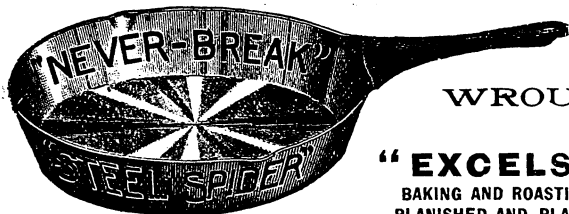
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(Ball Bearing)

for about the same price. It
is the leading Tricycle this
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Ask your Hard-
ware or Toy
jobber for
them.

**The Toledo Metal Wheel Co.,
Toledo, O.**

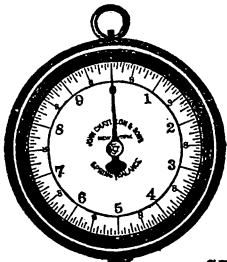


"MIRROR POLISH," the only Perfect Plain Steel Finish.

"NEVER-BREAK"
WROUGHT STEEL COOKING UTENSILS.
MIRROR POLISHED-TINNED-PORCELAINED.
"EXCELSIOR" "PURITAN" "IDEAL"
BAKING AND ROASTING PANS, COOKERS, COFFEE POTS AND
PLANISHED AND PLAIN STEEL. OTHER SPECIALTIES.
BRASS, BRONZE, NICKEL UMBRELLA STANDS, CUSPIDORS, ETC., ETC., ETC.
THE BRONSON SUPPLY CO.,
CLEVELAND AND NEW YORK.

John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK



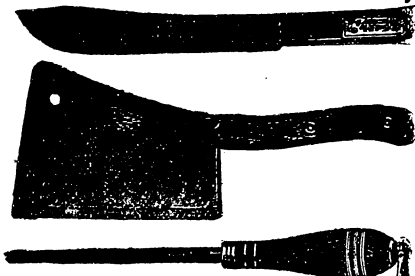
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1835.

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PRICE LIST



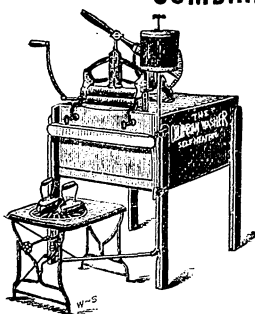
Sole Agents for

Foster Bro.'s Butchers' Cutlery.



John Chatillon & Sons, N. Y.

COLUMBIAN WASHER and STOVE COMBINED.



The most complete washer on the market.

Benbow
M'fg Co.,
St. Louis.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.
Equal to the best Gas Light.
Will not Blow Out in the Strongest Wind.
Will not Smoke.
Will not Freeze.
Automatic Extinguisher.
Outside Wick Regulator.
Will Burn Four Hours for One Cent.

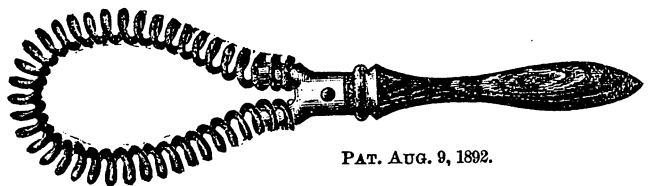
MANUFACTURED BY

STEAM GAUGE AND LANTERN CO.,

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

THE BOSS DUST BEATER.



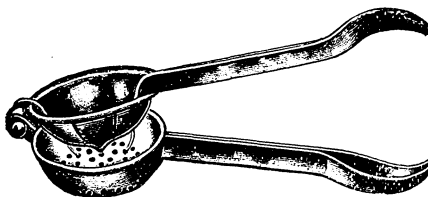
PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

Sent by Mail, 35 Cents.

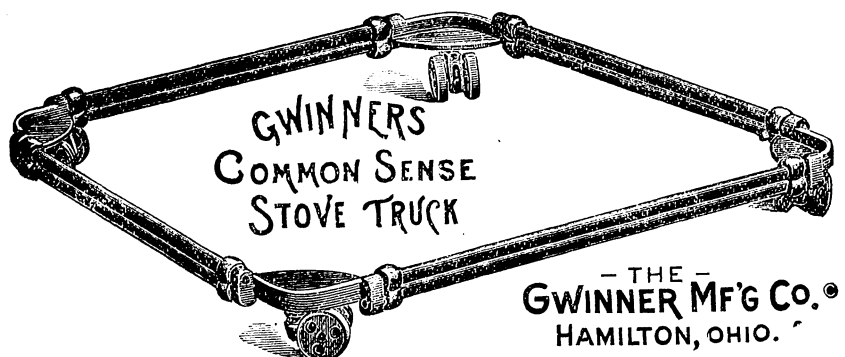
PEABODY & PARKS,
Manufacturers, **TROY, N. Y.**



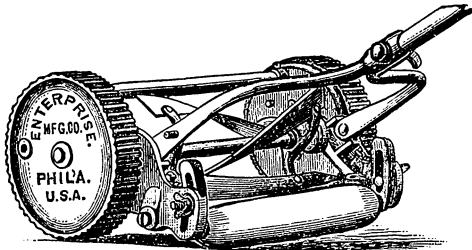
Do you make Lemonade?

If so you want our Squeezer. Positively the best. Suitable for any size Lemon. Write for catalogue and prices.

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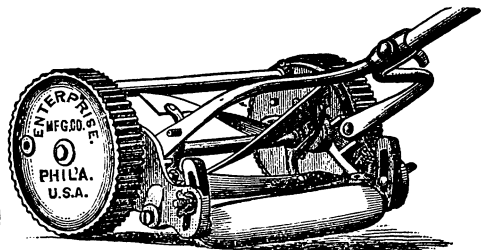
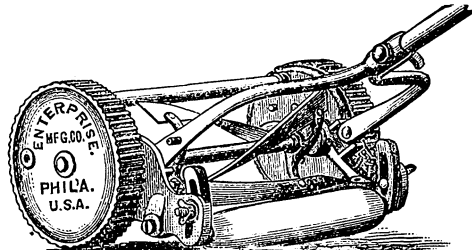


— THE —
GWINNER M'FG CO.®
HAMILTON, OHIO.

THE ENTERPRISE M'FG CO. OF PA..Third and Dauphin Sts.,
Philadelphia, U. S. A.

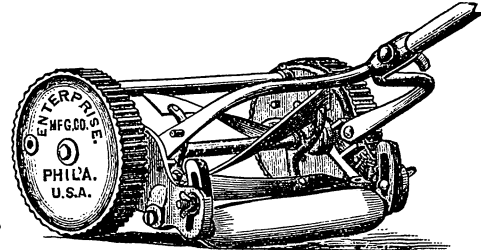
7, 9, 11, 13, 15 inches.

—O—
PAINTED
and
TINNED.

**ENTERPRISE LAWN MOWERS!**

EQUAL TO
the
BEST.

—O—
Prices quoted
on Application.

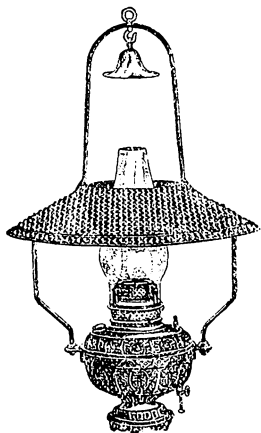


FOR SALE BY THE HARDWARE TRADE.
Branch Office and Warehouse with J. C. McCarty & Co., 97 Chambers Street, New York City.

SEND FOR CATALOGUE, FREE.

THE LAMP TO LIGHT YOUR STORE.

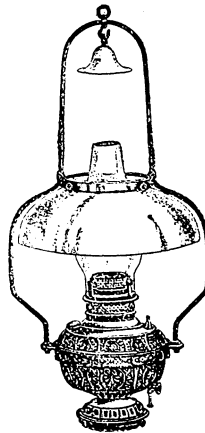
MAMMOTH CENTRAL DRAFT BANNER.



With 20-inch Tin Shade.

No. 858 Size 3.

Enlarged Oil Pot
No Smoke.
No Smell.
Cheaper and Better than Gas.
300 Candle Power.
Holds One Gallon Oil.
Burns Brightly about 10 hours.



With 14-inch Dome Shade.

The Banner is the only Pount having Extra Feeder Wick which supplies oil to the Burning Wick Harp has our Patent Extension Band, allowing Pount to pass down and through instead of lifting over as in the old style harp. Flame is regulated by our Improved Ratchet Movement. This Movement gives an exactness and nicety in adjusting that is not possible in any other wick raising device.

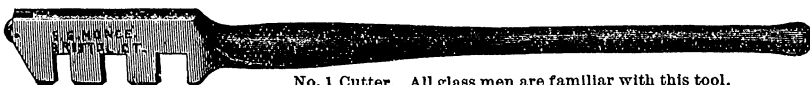
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THE PLUME & ATWOOD MFG. CO.,
NEW YORK. BOSTON. CHICAGO.

CLOTHES WRINGERS.
COLBY WRINGER CO.,

MONTPELIER, VT.
HAVE YOU Our Price-List?

MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCILS



S. G. MONCE — — — BRISTOL, CONN.

No. 1 Cutter. All glass men are familiar with this tool.

AMERICAN BOLT COMPANY,

Manufacturers of

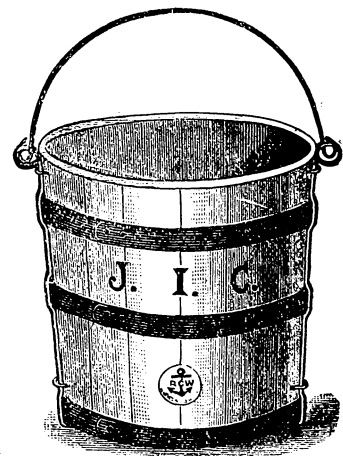
BOLTS AND NUTS, COACH OR LAG SCREWS

Bridge Bolts, Car Bolts, Track Bolts, Washers, Chain Links, BUILDING BOLTS
AND IRONS OF ALL KINDS, Forgings, Bolt and Nut Machinery, &c.

JAMES MINTER, President.

LOWELL, MASS.

MILES F. BRENNAN, Treas.

“Strapped.”

Patented Aug. 26, 1886.

Jay Eye See
Horse Bucket.
“Catch on” to that Strap!

It hooks under the bottom of stave.
Goes over each hoop.

Is securely riveted to side of bucket.
Hoops can't come off.

Bucket can't fall down. Prices furnished by

Richmond Cedar Works,

Manufacturers of Wooden Ware,

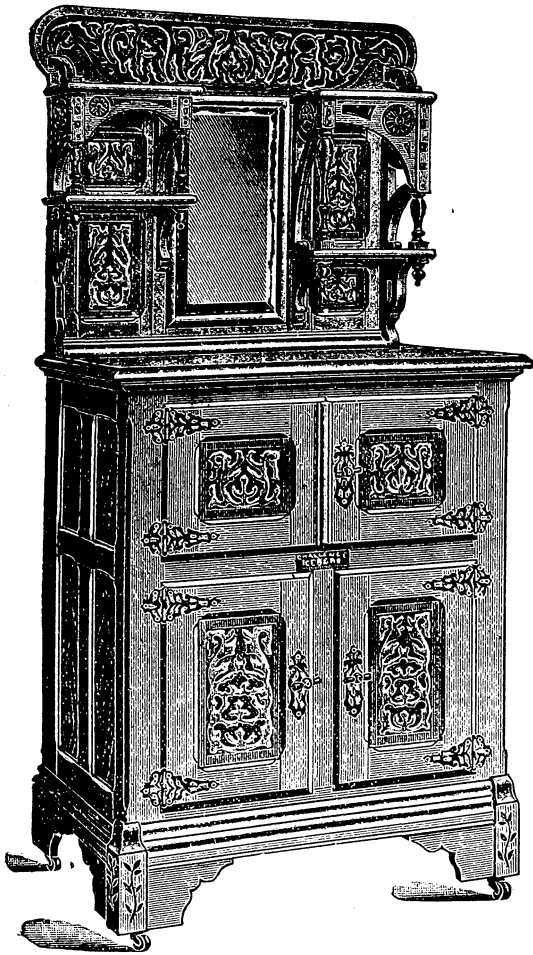
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American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.



BUY THE BEST. THE Challenge Iceberg Refrigerators,

MANUFACTURED BY

The Challenge Corn Planter Co.,

Grand Haven, Mich., U. S. A.

Write for our large Illustrated Catalogue for 1894.

All our goods are made of thoroughly kiln dried ash, finished in antique with shellac and coach varnish. Panels are beautifully hand carved. Trimmings are of solid bronze and are our own pattern. We use our own patent air tight locks, patent self-retaining malleable casters and floor plates, and patent drip cups. All refrigerators are filled with pure charcoal. The Challenge Iceberg Refrigerators are the best made for preserving all articles stored therein pure and sweet, as there is always a circulation of pure, dry, cold air. Refrigerators having water coolers are provided with bronze faucet and cup holder. All Sideboards have a fine beveled French plate mirror. We manufacture Refrigerators of all sizes from the ordinary Ice Chest to the largest sizes for grocers' and butchers' use, including the most elegant line of Dining Room Sideboard Refrigerators ever put on the market.

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D. W. Cushing, Boston, Mass.
F. M. Borden & Bro., Phila., Pa.
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Buhl, Sons & Co., Detroit, Mich.
Kent & Stuchfield, Denver, Col.
Chicago Stamping Co., Chicago, Ill.

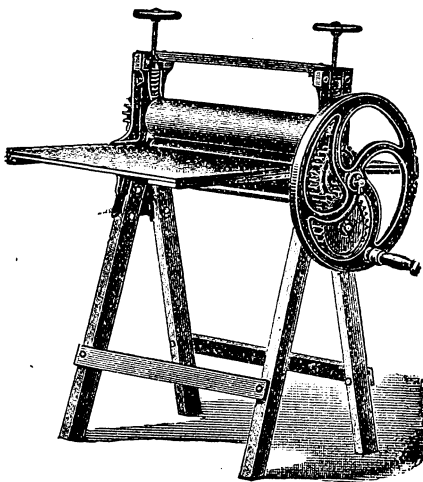
Lee-Clarke-Andreesen Hardware Co., Omaha, Neb.
John Pritzlaff Hardware Co., Milwaukee, Wis.
A. Baldwin & Co., New Orleans, La.
Gurney Refrigerating Co., Oakland, Cal.
Wm. Miller Range & Furnace Co., Cincinnati, O.

The Family Mangle.

WARRANTED TO DO
Better Work than Hand-Work.

SAVES all the fuel,
two-thirds the work.
Keeps the linen whiter.

We Guarantee Every Machine.



Send for descriptive circular to
S. C. Johnson, Racine, Wis.
Agents Wanted.

**COMMON MOUSE TRAPS
BEST FOR USE!**

Ripley Mfg. Co., Unionville, Conn



Porcelain-Lined Lemon Squeezers,
Steak Hammers, Boot Jacks,
Magnetic Tack Hammers, Mal-
lets, Bung-Starts, Hand Screws,
Beacon Hill Pat. Mouse Traps,
Sunny-Side 2 lb. Lap Board.

THE "NOISELESS" STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

M. CROISSANT,

ALBANY, N. Y.

Stone
Ware
Lined

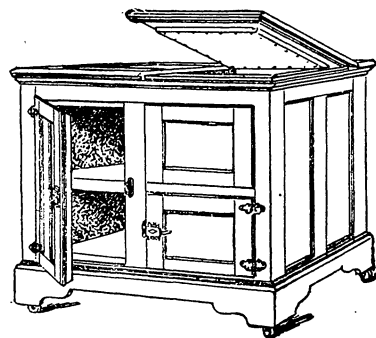
Refrigerators

SEAMLESS vitrified and glazed earthenware Provision Compartments. Practically indestructible; won't sweat, because of Perfect Dry Air Circulation. Liberally filled with the best Mineral Wool, and first-class in every particular Perfect cleanliness. No foul odors. Indurated Fiber Ice Racks that will not leak.

Quality Same, But Prices Lower.

WRITE FOR CATALOGUE AND DISCOUNTS.

Monroe Refrigerator Co., = = = Lockland, Ohio.



SAFETY KETTLE BOTTOM.

Made from **STEEL.**

Prevents meats and vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.



Cannot be Broken.

burning while cooking. Can be used Broiler, Toaster, etc.

PATENT APPLIED FOR.

FOR PARTICULARS ADDRESS,

DIAMOND HARDWARE CO., 620 ATLANTIC AVE., BOSTON, MASS.

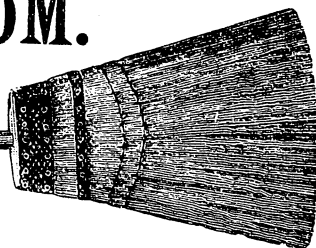
No. 4 RATTAN MIXED BROOM.

The Best Warehouse, Stable, Shop, Factory and Railroad Broom in the Market.

Made of Broom Corn and Rattan Reed mixed together, flat in shape, with an iron band, as shown in the cut, making it solid, substantial, and stiff, for handling the heaviest dirt. Will last longer than any other similar broom.

Brooms and Brushes for Railroad Shops, Warehouses, Street, Stable, Bloom. Chill, Casting and Moulding purposes a specialty. Write for prices.

JOSEPH LAY & CO., RIDGEVILLE, IND.



GOLDEN CROWN WARE.

EXCLUSIVE SALE IN EACH TOWN GIVEN

Allowance towards Advertising

Be Quick if you want Control of your City.

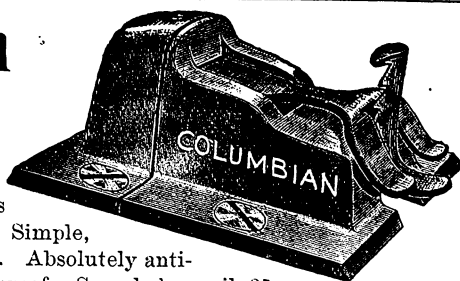
Particulars on Application.

THE STUART & PETERSON CO.,
Burlington, N. J., U. S. A.

Columbian

Sash

Locks three ways with one motion. Simple, strong and durable. Absolutely anti-rattle and burglar proof. Sample by mail, 35c.

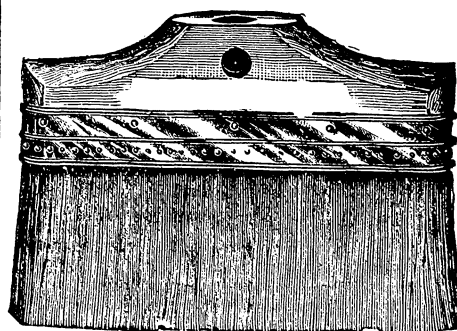


Lock.

COLUMBIAN SASH & DOOR LOCK CO.,
WAUSEON, OHIO.

BRUSHES

FOR THE



Hardware Trade,
Whitewash, Horse, Paint, Window,
Shoe,

And Every Variety of Brushes and

Wire Goods.

Close prices and prompt shipments. Get samples and catalogue for the asking.

Cincinnati Mfg. Co., Cincinnati, O.

NEW
and the
BEST.

"THE HUSTLER"

NEW
and the
BEST.

Post Hole Digger.

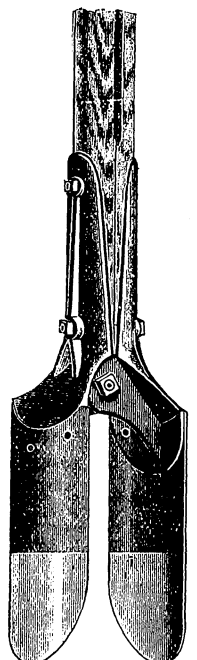
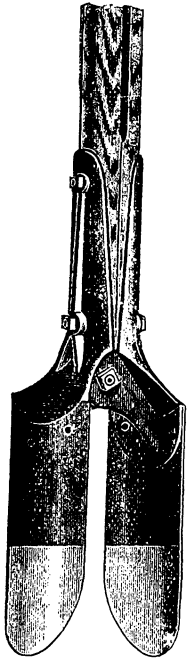
 **BUILT FOR BUSINESS.** 

This tool combines simplicity with correct form for easy and rapid digging. It is neat in design, finely finished, strong and durable.

The single round handle opens in halves to operate, being easily grasped and less tiresome than two separate handles; all other movements of split handles are liable to pinch the operator's hands.

This special style of bolting handles to shanks in round form enables them always to be kept tight in case of shrinkage. A shoulder is provided at the bottom to receive the full thrust, instead of on the bolts. This is not found in other makes, and prevents handles from splitting.

The best materials only are used. Fully guaranteed.



5—Other Styles of Post Hole Diggers to Suit all Soils.—5

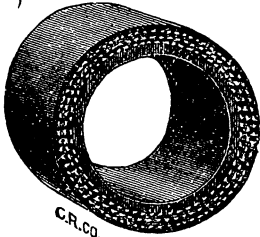
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JOHN H. GRAHAM & CO..

**113 Chambers St.,
NEW YORK.**

NEW SEAMLESS TUBE



C.R.CO.

Who Has Not Had Bad Hose ?

Who has not lost time, patience, money, by attempting settlement for such goods ?

THE CAUSE in nine cases out of ten is the lapped seam.
THE REMEDY is in buying our

PATENT SEAMLESS TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.

Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

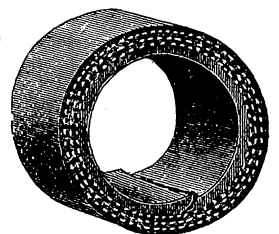
CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,

CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

OLD LAPPED TUBE



We were awarded an order of 25,000 ft. for World's Fair of our celebrated

**Seamless-Tube
COTTON RUBBER-LINED HOSE.**

We Want Your Trade.
Send for 80-page Catalogue.
Write for Prices and Samples.

SALES OF
Over Two Million Feet
—OF—

GARDEN HOSE

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

Boasting Will Not Sell . . .



The best Flour Sifter that's made without it has the necessary merit claimed for it and features that excel all others. The Hunter, possessing the most merit and good features, hence is the most popular.

The FRED J. MEYERS MFG. CO.,

HAMILTON, O.

**F. J. MATTISON, Eastern Agent,
NEW YORK.**

IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

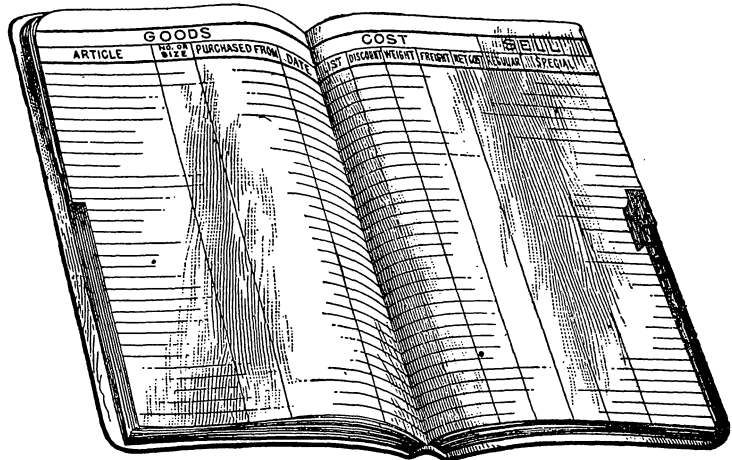
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

A, 200 pages,	-	-	-	-	-	\$1.00
A F, 200 pages with flap,	-	-	-	-	-	1.25
A 2, 400 pages,	-	-	-	-	-	1.50
A F 2, 400 pages with flap,	-	-	-	-	-	1.75



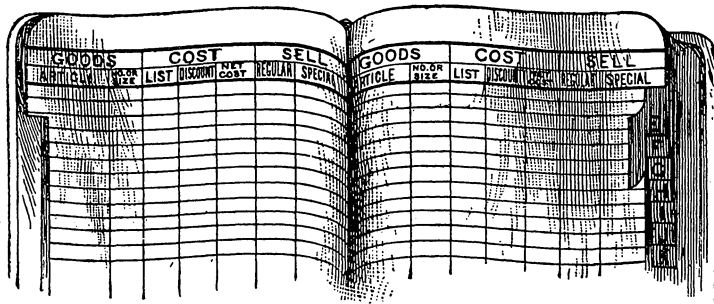
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

B, 200 pages	-	-	-	-	-	\$1.00
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B 2, 400 pages,	-	-	-	-	-	1.50
B F 2, 400 pages with flap,	-	-	-	-	-	1.75



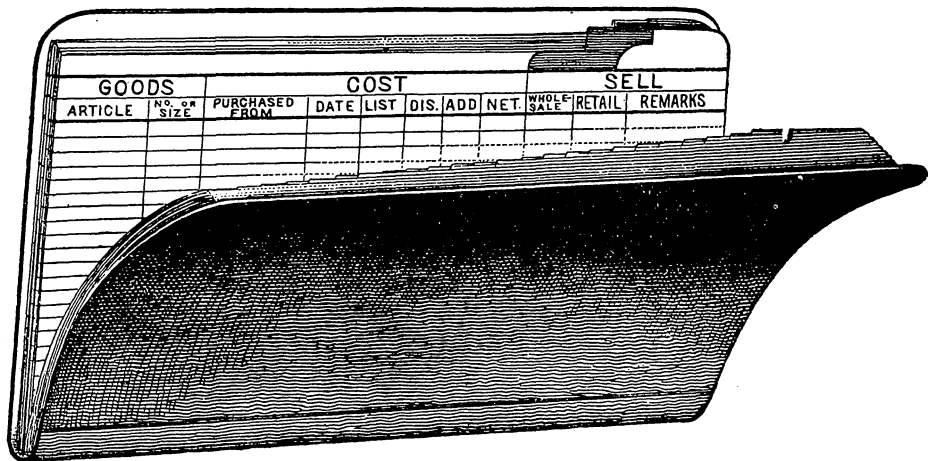
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

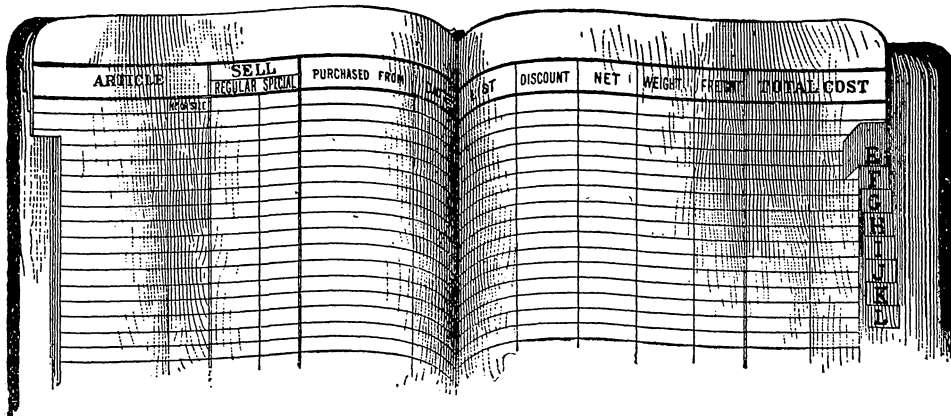
Size, 4½ x 7½ in.; grain seal leather.

FOUR EDITIONS.

C, 200 pages,	-	-	-	-	-	\$1.00
C F, 200 pages with flap,	-	-	-	-	-	1.25
C 2, 400 pages,	-	-	-	-	-	1.50
C F 2, 400 pages with flap,	-	-	-	-	-	1.75



Hardware Price Book C.



Hardware Price Book D.

arrangement is adapted to the requirements of the trade in this direction. Size 5½ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages,	-	-	-	-	\$2.00	D 2, 400 pages,	-	-	-	-	\$3.00
	D F, 200 pages, with flap,	-	-	-	-	2.50	D F 2, 400 pages, with flap,	-	-	-	-	3.50

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This arrangement

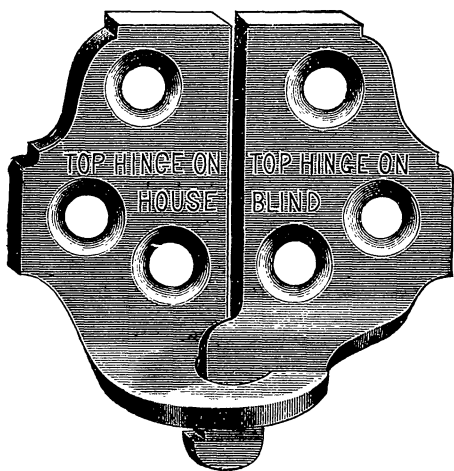
Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York.**

THE STANLEY WORKS

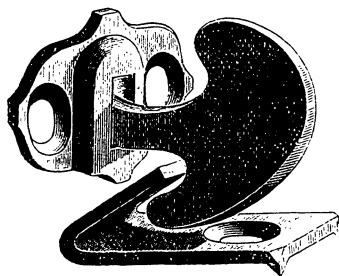
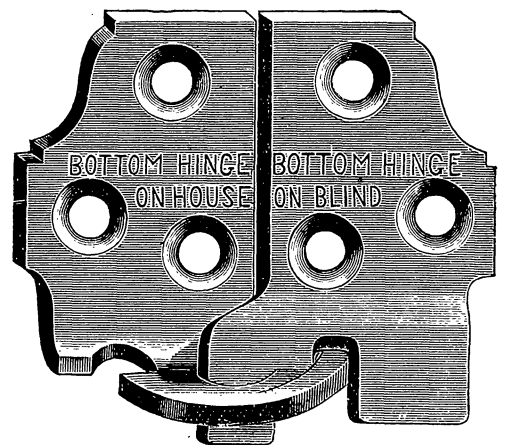
NEW BRITAIN, CONN., AND 79 CHAMBERS ST., NEW YORK,

PRODUCERS OF

**Butts, Hinges, Door Bolts, Blind Trimmings,
ETC.,
FROM WROUGHT STEEL.**



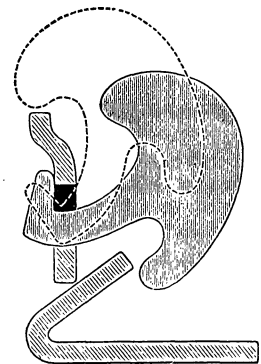
**Wrought
Steel
Gravity
Blind
Hinges**



FOR

Wood.

PATENTED.



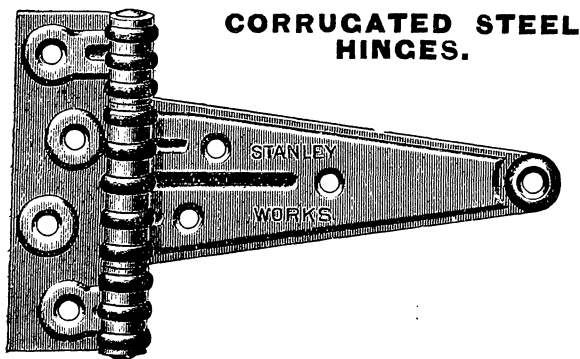
These Hinges lock the blind by the action of gravity, and, being made from heavy gauges of wrought steel, will not break.

Their improved construction enables the blind to be securely locked when open and the hinge to be unlocked without lifting the blind.

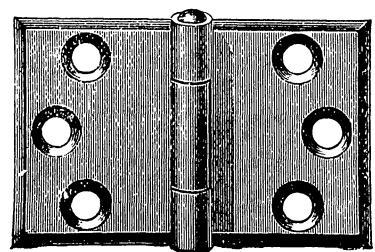
The improved sill catch prevents the closed blind from being opened from the outside.

These Hinges are applied in substantially the same manner as those ordinarily in use and require the same number and sizes of screws.

Each dozen set is packed in a neat paper box. Ten dozen sets in a case.



**WROUGHT STEEL
BUTTS.**



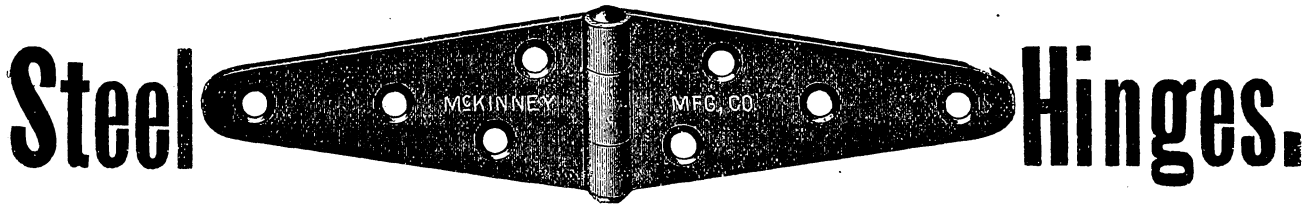
ANYTHING MADE FROM WROUGHT STEEL.

CORRESPONDENCE AND CATALOG FREE.

WE CLAIM

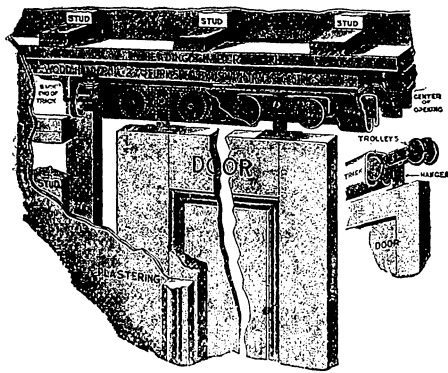
That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

McKINNEY MFG. CO., ALLEGHENY, PA.



SEND FOR LIST.

"NONE BETTER."



PARLOR DOOR HANGERS

The adjustment is in the Track and not in the Hanger, as in other fixtures.

Track can be taken out of Pocket and replaced without defacing walls after house is finished.

HIGHEST AWARD
AT WORLD'S FAIR 1893.

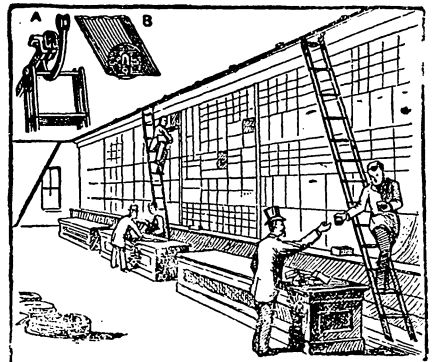
— ON —

Parlor, Barn and Fire Door Hangers.

SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.,
HOLYOKE, MASS.

We make four styles of Rolling Ladders to reach shelving of any height.



P. & F. CORBIN,

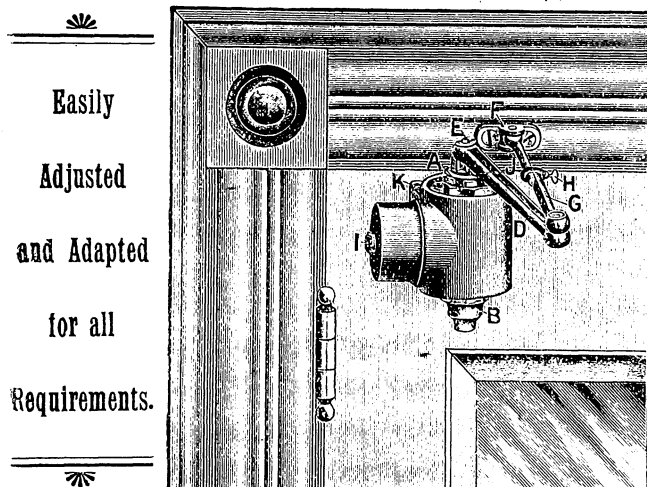
New Britain, Conn.

New York.

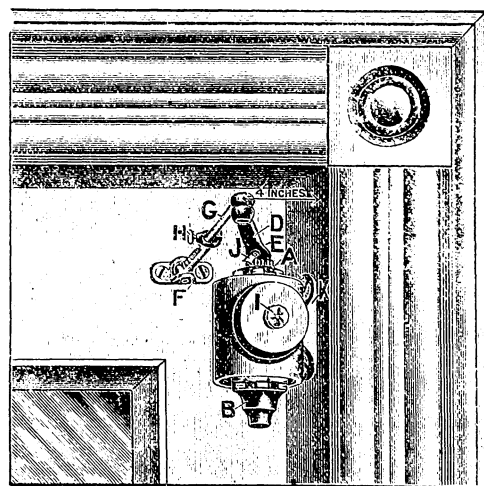
Philadelphia.

Chicago.

—) MANUFACTURERS OF (—



Easily
Adjusted
and Adapted
for all
Requirements.

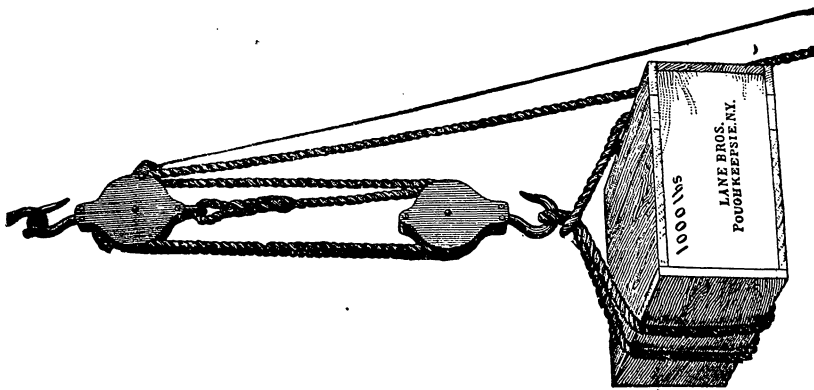


Looks Well,
Acts Well,
Wears Well.

LIQUID DOOR CHECKS AND SPRINGS,

Fine Builders' Hardware. Wood AND Machine Screws.

Catalogues and Prices Furnished on Application.



LANE'S SELF-LOCKING TACKLE BLOCKS,

Anti-Friction Steel Bushings,

Holds the load at any point, and always sure.

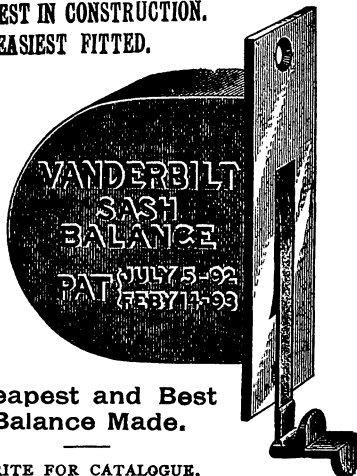
SEND FOR CIRCULAR.

For sale by the Hardware trade.

—MANUFACTURED BY—

LANE BROS.
POUGHKEEPSIE, N. Y.

SIMPLEST IN CONSTRUCTION.
EASIEST FITTED.

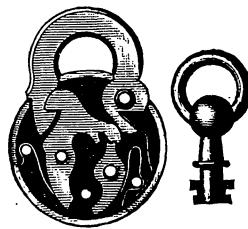


Cheapest and Best
Balance Made.

WRITE FOR CATALOGUE.

The Vanderbilt Sash Balance Co.,
CANANDAIGUA, N. Y.
General Agents, Harmon & Dixon, 118 Chambers St.
New York.

PATENT PERFECTION PADLOCK.



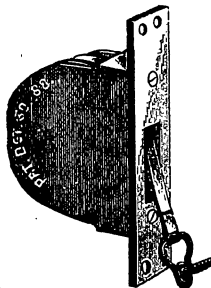
Eight Tumblers, Key Turning Both Ways.

Sizes, $\frac{3}{4}$ inch to $2\frac{1}{2}$ inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{8}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price-Lists and Circulars.



DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

CALDWELL MFG. CO., Rochester, N. Y.

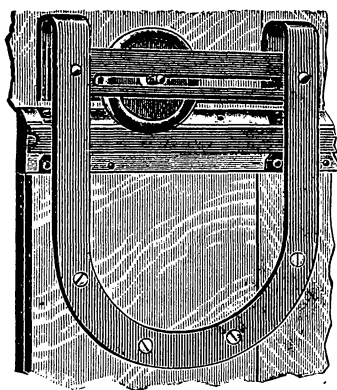
READING HARDWARE COMPANY.

We manufacture the
Celebrated "Duplex"
Wrought Butts—
Wrought Steel and
Wrought Bronze.

They are better than
the ordinary kinds in
every way.

NEW YORK, PHILA., CHICAGO.

Factories, *READING, PA.*



HIGHEST AWARD
WORLD'S
COLUMBIAN EXPOSITION
— ON —
BARN DOOR HANGERS.

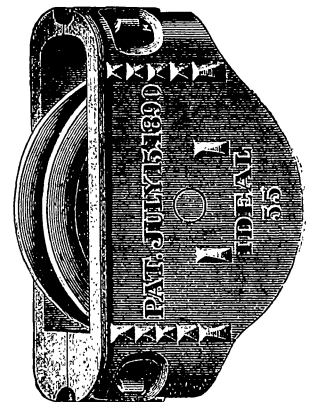
For catalogue and prices, address

Chicago Spring Butt Co.,
CHICAGO, ILL.,
or 97 CHAMBERS ST., N. Y.

PHILLIPS SCREENS

Are Reliable.

Ideal Sash Pulley, No 55.

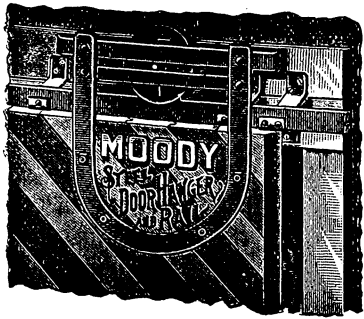


Adapted for auger socket or machine made mortise. Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

STOVER MFG. CO.,
145 River St., Freeport, Ill.



VICTOR MFG. CO., Newburyport, Mass.

STEEL RAIL.

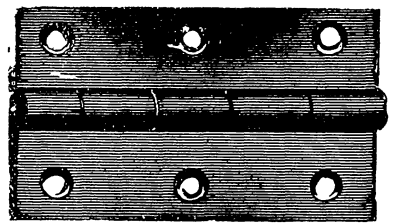
Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

PRICE-LIST.

HANGERS.	Per Doz. prs.
No. 5, to run 8 feet, 3 1/4 in. wheel,	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	22.00
RAIL, per foot.....	6 1/2 cents.

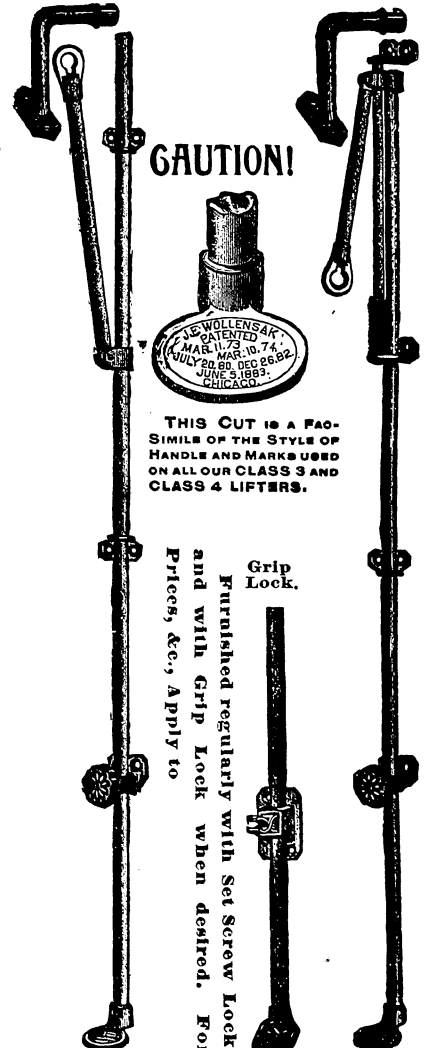
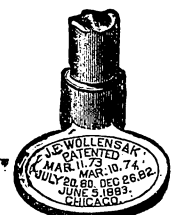
**Cast Brass Butt Hinges**

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.****Transom...Lifters****OLD RELIABLE****J. F. WOLLENSAK'S PATENT.****CLASS 3.****CLASS 4.****CAUTION!**

THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Grip Lock.
Furnished regularly with Set Screw Lock, and with Grip Lock when desired. For Prices, &c., Apply to

J. F. WOLLENSAK, - CHICAGO, ILL.

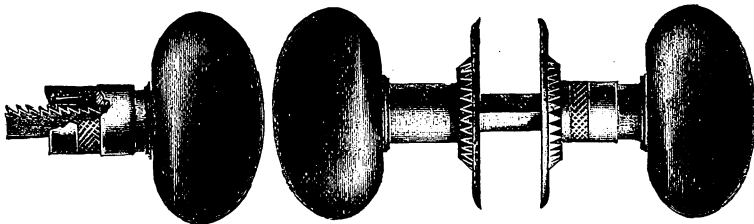
PAT. NOV. 9, 1892.

**BUY
BRADLEY
BRACKETS!!!**

Your Customers will like them. They are made of steel and are not brittle. They are light, strong and artistic. They can be put up with nail and hammer. Write for prices.

ATLAS MFG. CO.,
New Haven, - - Conn.

Sectional cut showing construction of knob.

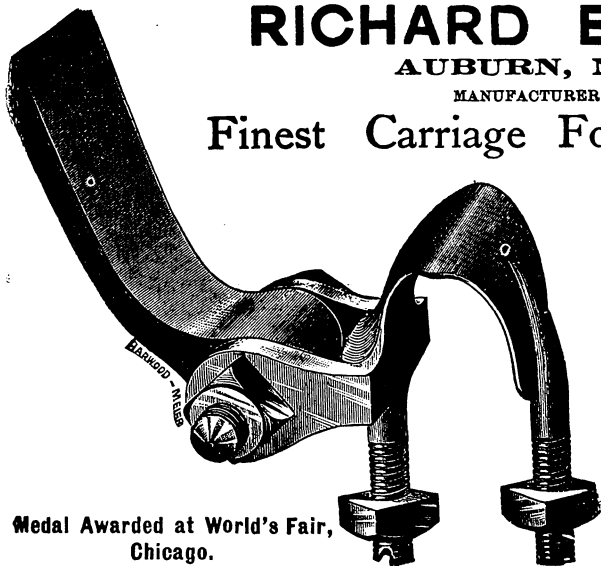


Half size cut of knob as applied to door. No side screws or adjusting washers.

The Whipple Patent Door Knob. Patented Nov. 7th, 1893, other Patents pending.Constructed on an entirely new principle neither expensive nor complicated. Secures perfect adjustment to doors with strength and durability. Use it and avoid the disagreeable end chace and general looseness of the ordinary knob. For Catalogue and Price-List address **THE PERRY & WHIPPLE CO.** New Haven, Ct.**RICHARD ECCLES,****AUBURN, N. Y.,**

MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.



Medal Awarded at World's Fair, Chicago.

Send for New Catalogue for Season 1893-94

PARTIES DESIRING**SUPERIOR QUALITY LIGHT MALLEABLE CASTINGS**

(SOMETHING MUCH BETTER THAN THE ORDINARY)

From their own Patterns—Molded True to Pattern—in Quick Time—and at Reasonable Prices—Are Requested to send Samples, stating Quantity Used, to

WALTER W. WOODRUFF & SONS,**MOUNT CARMEL, CONN.****WHY USE WOODEN OR HEAVY STEEL BLOCKS**

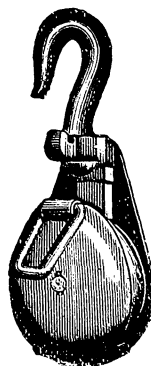
WHEN THE STEEL AND IRON

TACKLE BLOCKS

—MADE BY—

The Cleveland Block Co.**CLEVELAND, OHIO, U. S. A.,****ARE BETTER IN EVERY WAY.**

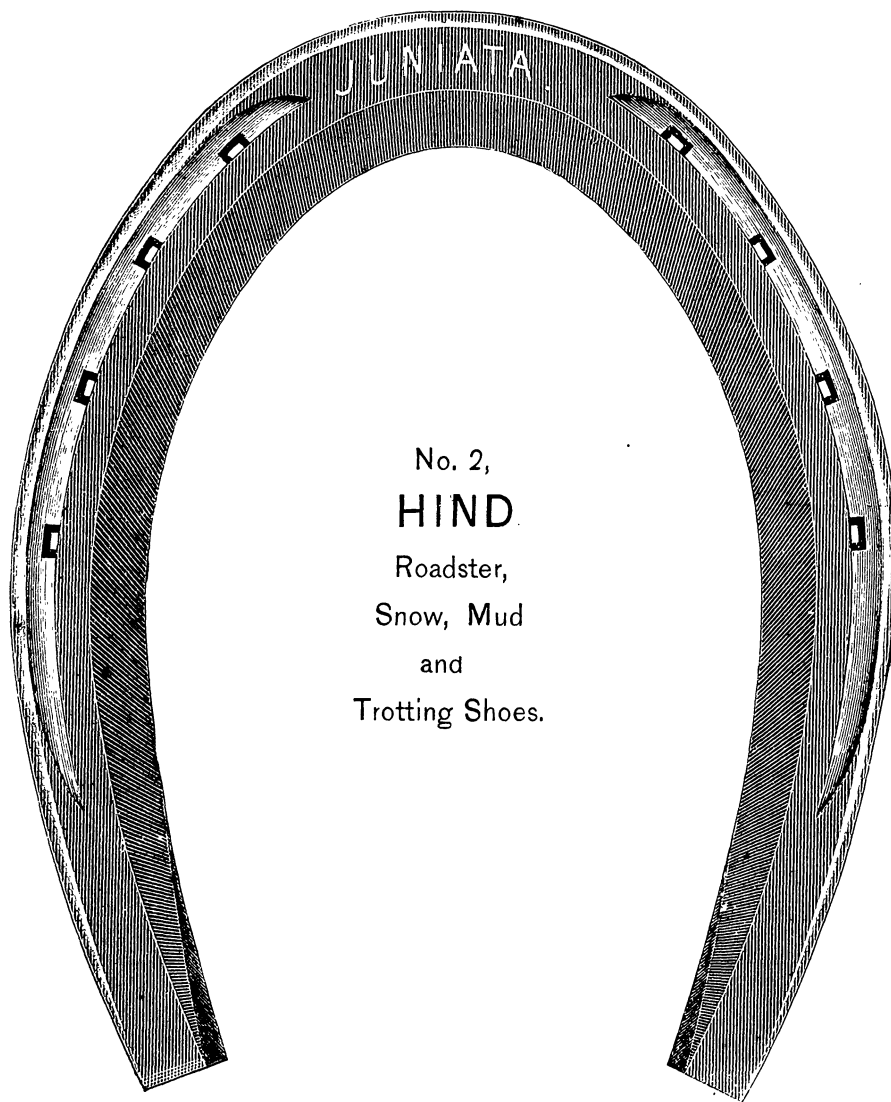
No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable

General Agents: **Topping Brothers, 92 Chambers Street, New York.**
The H. Channon Co., 22 Market Street, Chicago.New England Agents, - **Dodge, Haley & Co., 212 High Street, Boston.**

STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



No. 0,—Weight, 8 oz.
 No. 1, “ 10 oz.
 No. 2, “ 12 oz.
 No. 3, “ 15 oz.

No. 4,—Weight, 19 oz.
 No. 5, “ 22 oz.
 No. 6, “ 26 oz.
 No. 7, “ 31 oz.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

SHOENBERGER & CO.,

JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

SCRANTON FORGING CO.,

SCRANTON, PA

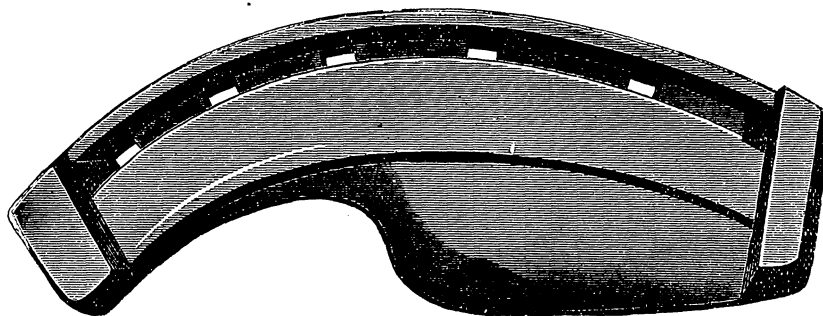
CARRIAGE HARDWARE ^{AND}

SPECIAL DROP FORGINGS.

FORGED

OX

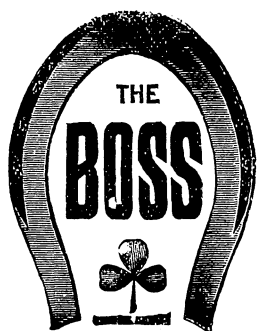
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



HORSE AND MULE SHOES

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,
MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.
F. W. CARPENTER, Pres., C. H. PERKINS, Gen. Manager, R. W. COMSTOCK, Sec'y,
CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.,
WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blued Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

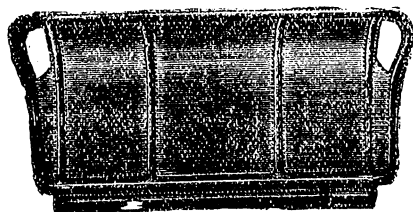
PHILADELPHIA OFFICE,
206 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE,
11 Pine St.

McKINNON DASH & HDW. CO.,

LIMITED, Manufacturers of



C. PATTERN.

SURREY DASH.

FINE QUALITY

DASHES

AND

FENDERS,

BUFFALO. - N. Y.

BURDEN'S

HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Poughkeepsie, N. Y.

NEW YORK OFFICE, No. 66 Reade St.

Standard Horse Shoe Co.,

Manufacturers of

HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

4 Liberty Square, Boston, Mass.



**"The Best
Driving
Nail."**



HIGHEST AWARD
—AT—
World's Columbian Exposition.

In the tests submitted before the judges on awards
the Capewell No. 6 was shown to be 17 per cent. tougher
than No. 8 of other makes.

**"The Best
Nail to
Hold."**





CAPEWELL HORSE NAILS,
 —MADE BY—
THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.

Office of D. C. BURNHAM,
 Director of Works, World's Columbian Exposition,
 JACKSON PARK, CHICAGO, ILL.

**The
Capewell
Patent
Corrugated
Horse Nail.**



October 23, 1893.
 To THE CAPEWELL HORSE NAIL CO.:
 Gentlemen—I have used your horse nails here on the horses belonging
 to the World's Columbian Exposition, and I think they are far supe-
 rior to any others that I have ever used. As I have been in the
 horseshoeing business for about twenty-five years, I know
 what I am talking about.
 Very respectfully,
 HERMAN J. HENKE,
 Foreman Blacksmith, World's Colum-
 bian Exposition.

**Needs
No
Clinching.**

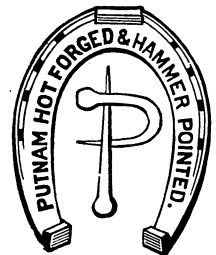




Highest Award

FOR
Supreme Excellence
 TO

The **PUTNAM** Hot-Forged and
 Hammer-Pointed Horse **NAILS,**



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:
*"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity
 and smoothness combined with holding power in clinch.
 It allows the use of very small nails."*

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except
 the "material from which it is made," "the method of manufacture," and "quality of finished product."
 Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while
 the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their
 "supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest
 service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith.
 Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what
 qualities go to make up a good horse nail and that only the "Putnam" contains them all.

PUTNAM NAIL CO.,
 Neponset, Boston, Mass.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of


CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.

P. F. BURKE, C. F. DEWICK & CO.
Successors to
Manufacturers of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 Worcester St. Die for Welding
BOSTON, MASS. Sharp Calks.




Elegant Iron.

Beautiful Shape.

HORSE SHOES,

Light, Medium and Heavy.

MULE SHOES,

Light, Medium and Heavy.

Illustrated booklet and prices to all
parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

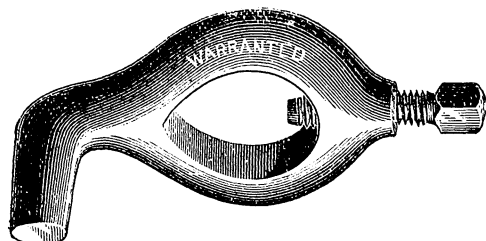
ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

LE COUNT'S HEAVY STEEL DOG,

With Steel Screws. U. S. Standard and the points hardened.



1.....	3/8.....	\$0 40	13.....	2 1/4.....	\$1 35
2.....	1/2.....	50	14.....	2 1/2.....	1 45
3.....	3/4.....	60	15.....	3.....	1 60
4.....	1.....	60	16.....	3 1/2.....	1 80
5.....	1 1/8.....	70	17.....	4.....	2 10
6.....	1 1/4.....	70	18.....	4 1/2.....	2 75
7.....	1 1/2.....	80	19.....	5.....	3 25
8.....	1 3/4.....	80	Full set of 19, \$23.60.		
9.....	1 7/8.....	95	20(extra)	5 1/2.....	4 00
10.....	2.....	95	21.....	6.....	5 00
11.....	2 1/4.....	1 10	22.....	7.....	6 00
12.....	2 1/2.....	1 20	23.....	8.....	7 00
One small set of 8, by 1/4 in. to 2 in.			6 25		
One set of 12, by 1/4 in. to 2 in., con-					
tinued by 1/2 in. to 4 in.			13 20		

When ordering, state as above, whether a full set, or a set of 12, or small set of 8, is wanted.
SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

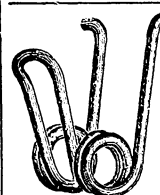
C. W. LE COUNT, MANUFACTURER. SO. NORWALK, CONN., U. S. A.

These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

Crescent
Horse and Mule Shoes,
BAR IRON.

CRESCENT HORSE SHOE AND
IRON CO.

Max Meadows, Va.



FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Cut One-half Size.
Sample pair sent to any hard-
ware or saddlery firm by ad-
dressing

The Frost Thill Spring Co.,
Boston, Mass.

P. J. Conroy & Co.,

Paschall, PHILADELPHIA.

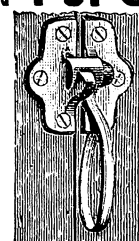
"CONROY"

Refrigerator Door

Fasteners

Have rapidly supplanted all
others.

Refrigerator Trimming

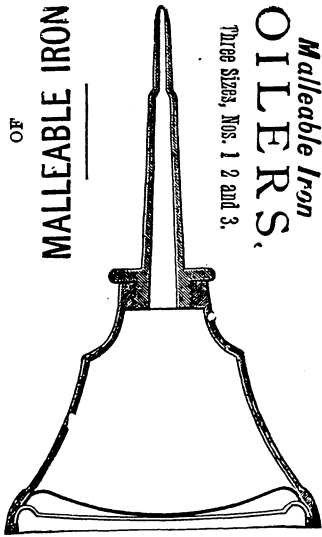


Pat. Dec. 15, '85

BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.

Patented Articles
OF
MALLEABLE IRON

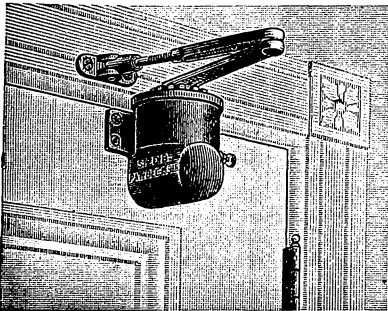
New Improved
PATENT
Malleable Iron
OILERS,
Three sizes, Nos. 1 2 and 3.



Hammer's Adjustable Clamps.
Mall. Iron Hand Lamps.
M. I. Hanging Lamps
New Pattern Heavy Screw Clamps.
Strongest in the market.

For Sale by all the Principal Hardware Dealers.
SEND FOR PRICE LIST.
MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
in Malleable Iron, made to order.

HAMMER & CO., Branford, Conn.



Bardsley's Liquid Door Check and Spring

Perfect in action, durable, neat in appearance, low in price and fully warranted. Responsible Agents wanted in the principal cities.

J. BARDSLEY, 149 & 151 Baxter St., New York.

HARDWARE DEALERS

CAN RECOMMEND THE

**CHAMPION METAL WINDOW
SASH CHAINS**

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

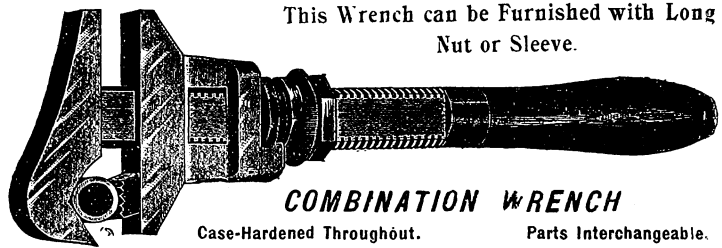
"THOMAS MORTON,"

65 Elizabeth Street,

Write for Prices.

NEW YORK.

The Practical Polish and Varnish Maker.
By H. C. STANDAGE. A treatise containing 750 receipts and formulae for the manufacture of varnishes, polishes, &c. 12mo, cloth.....\$2.50
For Sale by **DAVID WILLIAMS, 96-102 Reade St., N.Y.**



This Wrench can be Furnished with Long Nut or Sleeve.

COMBINATION WRENCH

Case-Hardened Throughout.

Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.



TRIMO PIPE WRENCH,

Forged Steel.

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

**TRIMO
CHAIN
PIPE
WRENCH.**



Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.

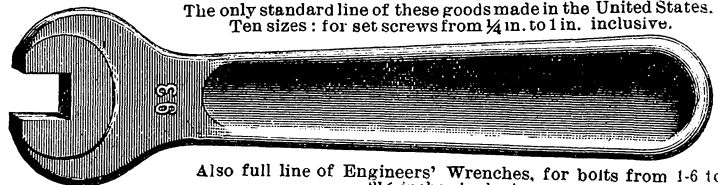
Can be used with one hand and in closer quarters than any other Basin Wrench. Parts Interchangeable.

**TRIMO
BASIN WRENCH.**

**TRIMONT MFG. CO., ROXBURY
MASS.**

DROP-FORGED STEEL SET-SCREW WRENCHES.

The only standard line of these goods made in the United States.
Ten sizes: for set screws from 1/4 in. to 1 in. inclusive.



Also full line of Engineers' Wrenches, for bolts from 1-6 to 2 1/4 inches inclusive.

J. H. WILLIAMS & CO.,

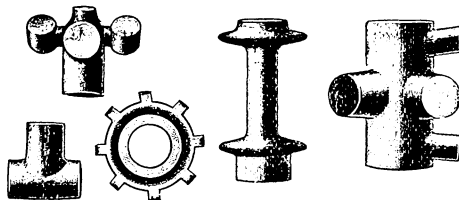
9 to 15 RICHARDS ST.,

—MANUFACTURERS OF—

BROOKLYN,

Brock's Patent Drop-Forged Chain Pipe Wrench,

and Lathe Dogs, Collars, Thumbscrews and special Drop-Forgings of every description, from Iron, Steel, Copper and Bronze.



WYMAN & GORDON
WORCESTER, MASS.
DROP FORGINGS

**Billings' Patent Adjustable 6-in.
Wrench**



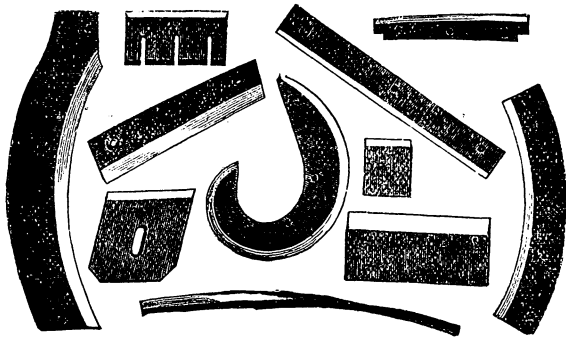
Drop Forged from Bar Steel. Sliding Bar
Graduated to the 32d of an inch.

TWO SIZES, 5 AND 6 INCH.

THE BILLINGS & SPENCER CO.

Hartford, Conn.

Drop Forgings of Every Description.



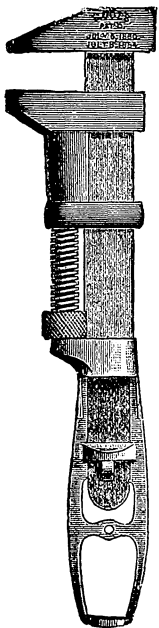
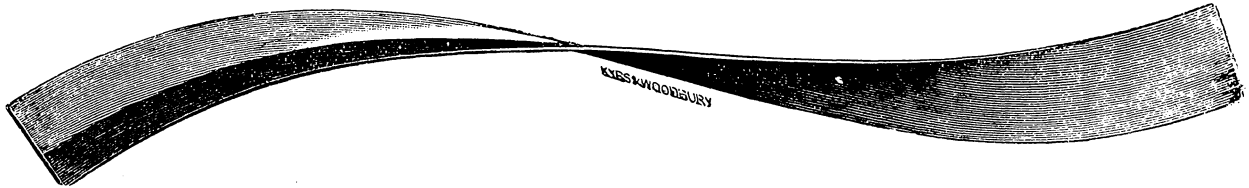
LORING COES & CO.

WORCESTER, MASS.

Manufacturers of MACHINE KNIVES.

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.



L. COES'

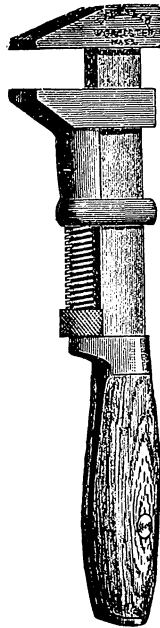
Genuine Improved
KNIFE HANDLE
PATENT

Screw Wrenches

MANUFACTURED BY
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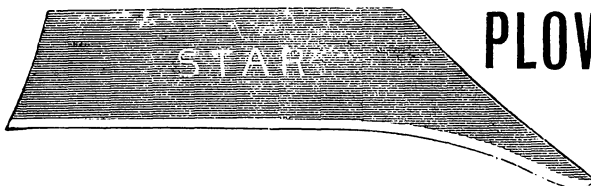
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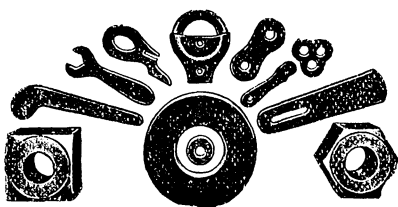


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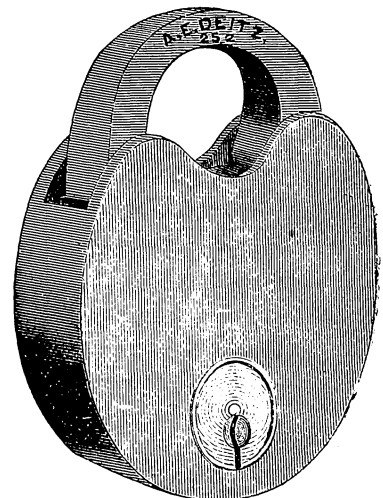
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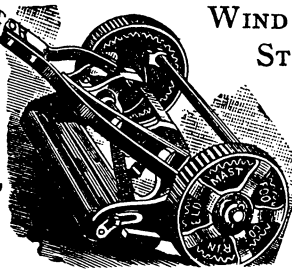
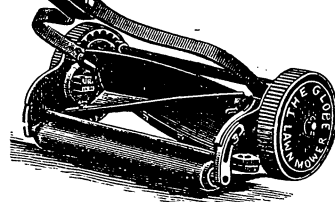
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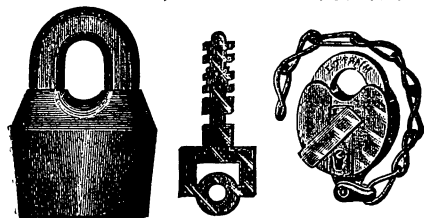
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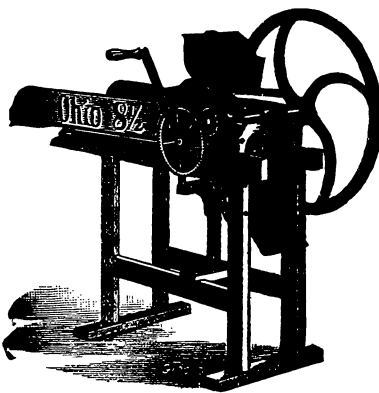
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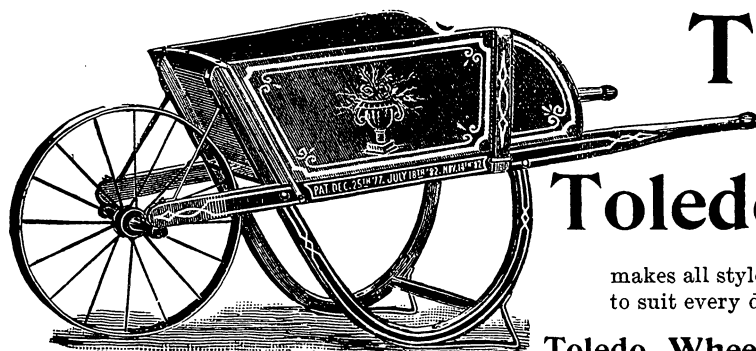
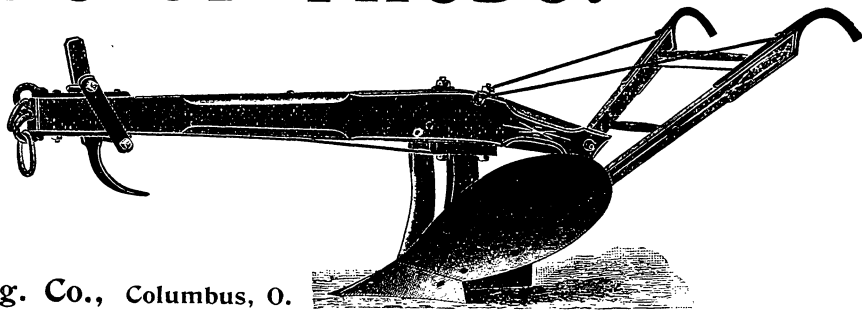
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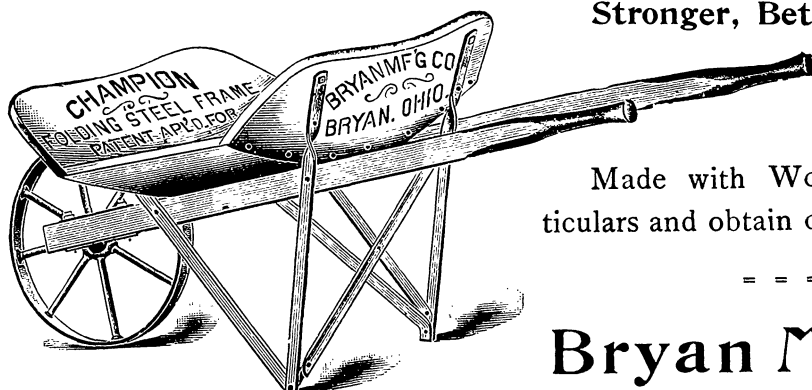
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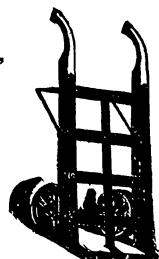
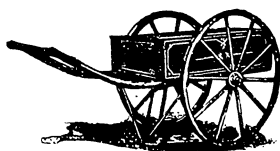
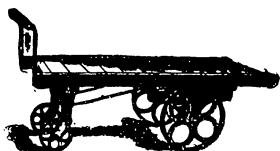
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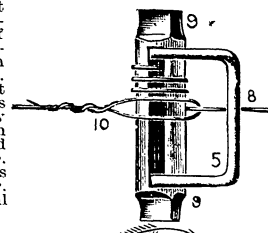


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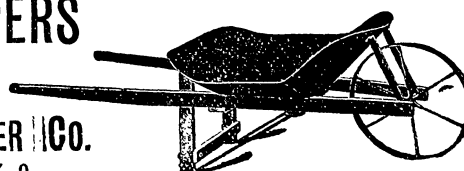
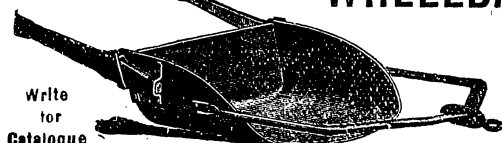


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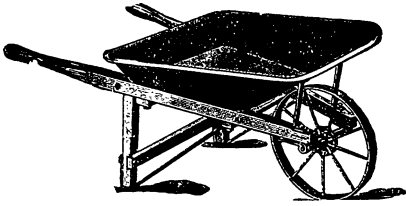
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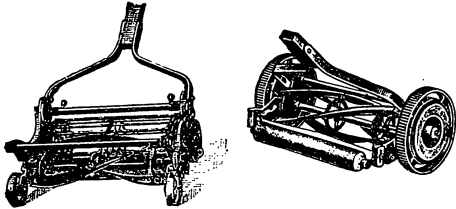
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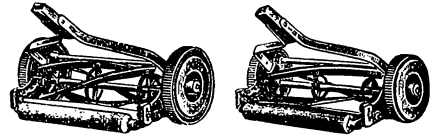


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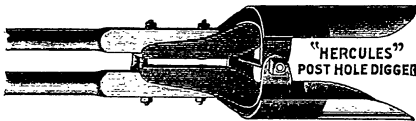
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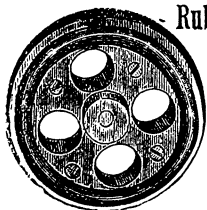
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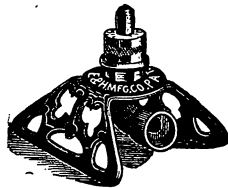
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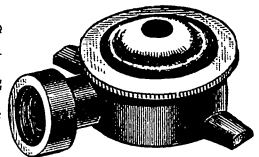
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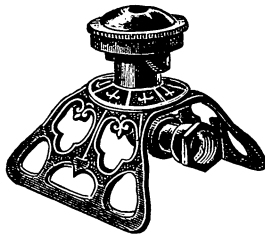
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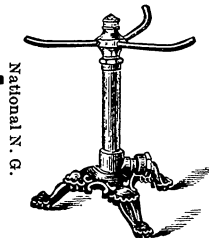


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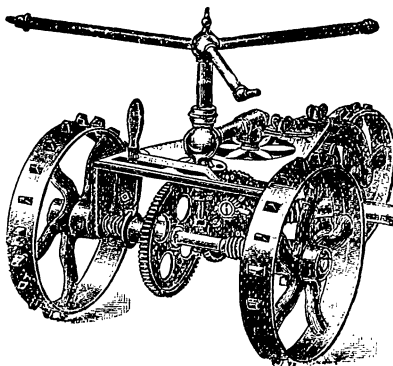
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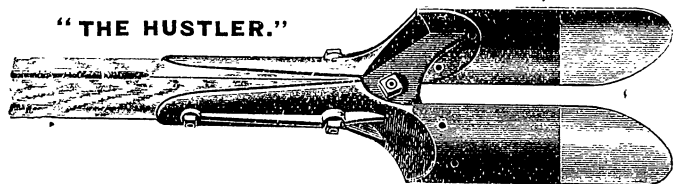
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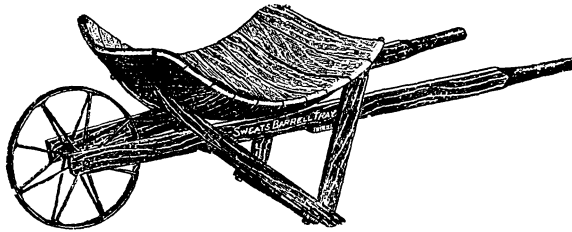
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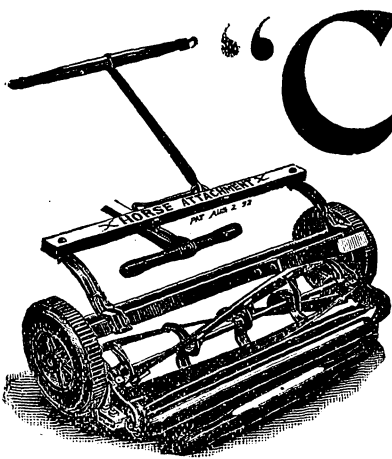
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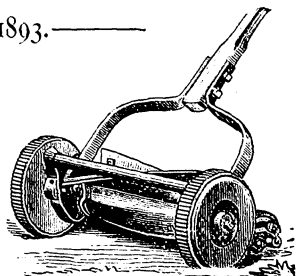
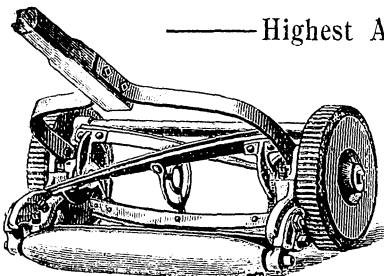
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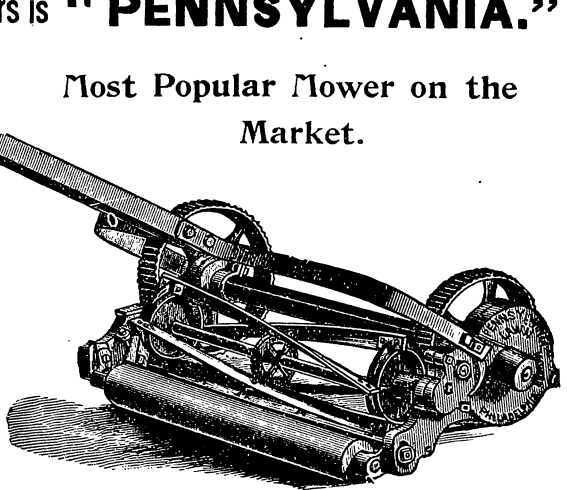
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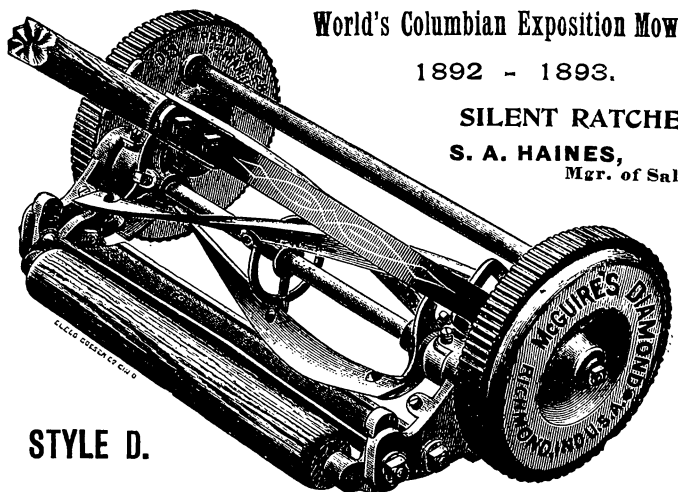
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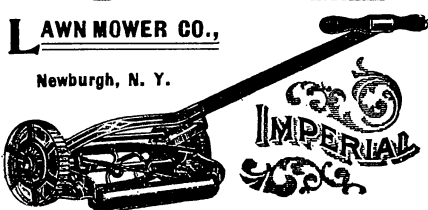
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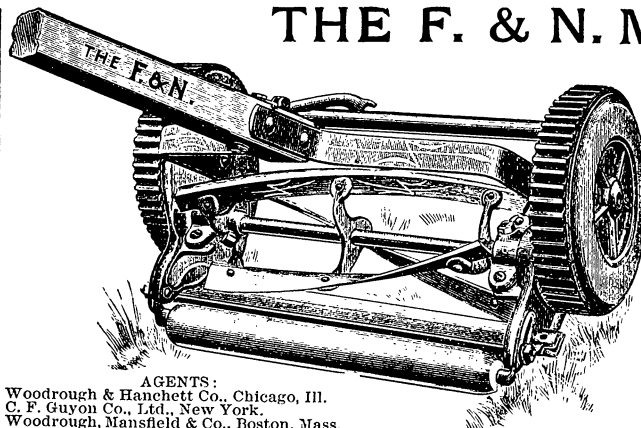
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Grass Catchers,
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THE
F. & N.
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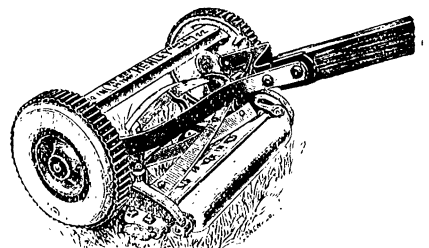
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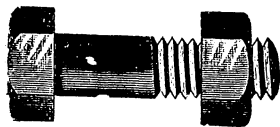
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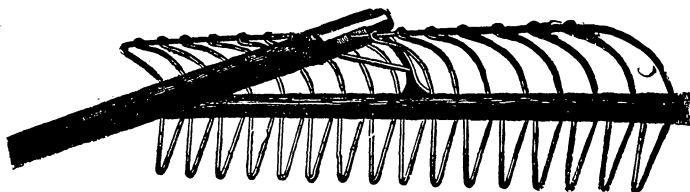
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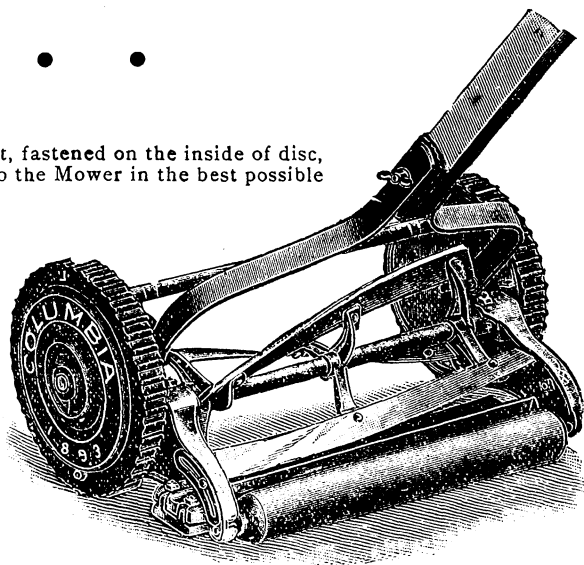
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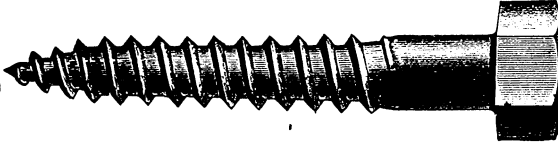
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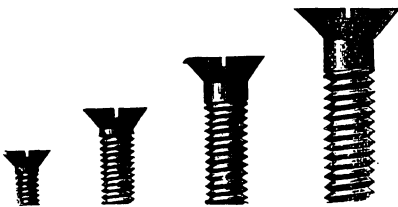
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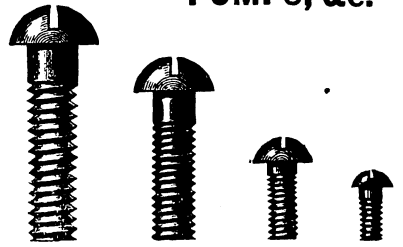
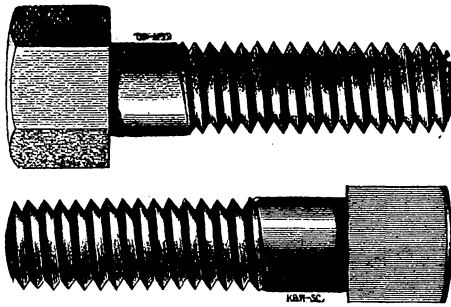
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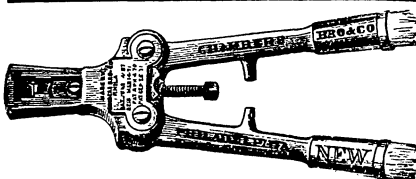
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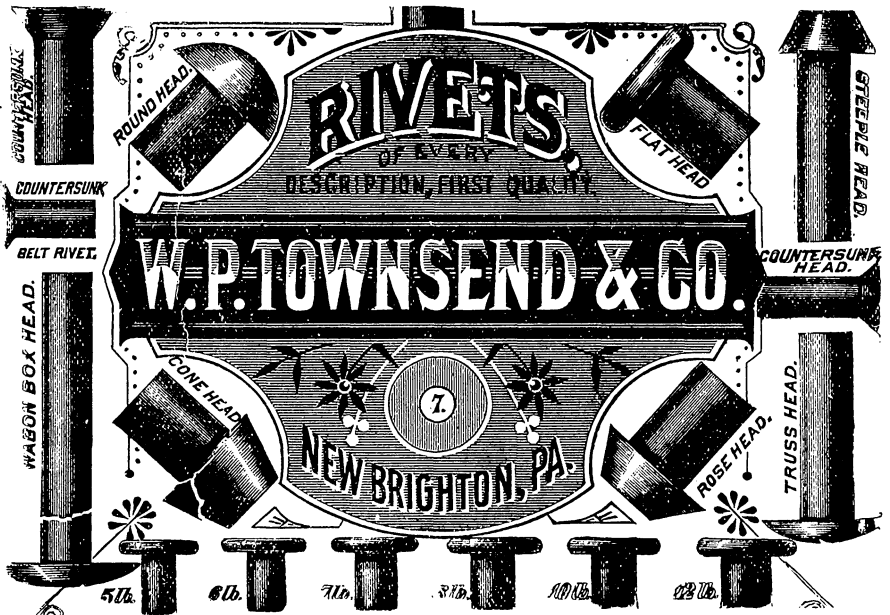
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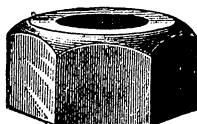
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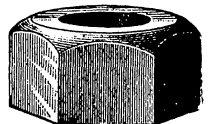
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- Files and Rasps. Manufacturers of.**
Arcade File Works, Anderson, Ind.
Banker & White, Troy, N. Y.
- Barnett, G. & H., 41 & 43 Richmond Phila.**
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick. Makers of.**
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Sons, foot E. Houston, St. McLeod & Henry Co., Troy, N. Y.
Maurer, H. & Son, 420 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Solomon, Joo. M., Wilmington, Del.
vaentine, M. L. & Bro., Woodbridge, Mass.
- Fishing Tackle.**
Dane, Stoddard & Kendall, Boston, Mass.
- Flint.**
Crystal Mills Co., Chester, Mass.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**
Meyers, F. J. Mfg. Co., Hamilton, O.
- Flue Cleaners.**
Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges, Portable. &c.**
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Foos Mfg. Co., Springfield, Ohio.
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Eastern Forge Co., Boston, Mass.
Frankford Steel Co., Phila., Pa.
Granton Forging Co., Scranton, Pa.
U. S. Projectile Co., Brooklyn, N. Y.
- Foundry Facings.**
A. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
Solomon, Jno. M., Wilmington, Del.
- Foundry Middles.**
Estey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**
Colliau, Victor, Detroit, Mich.
Diamond Clamp & Flask Co., Richmond, Ind.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
- Friction Clutches.**
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.
- Friction Cone.**
Evans Friction Cone Co., Boston, Mass.
- Furnaces, Foundry.**
Byram & Co., Detroit, Mich.
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancoast, Henry B. & Co., Phila., Pa.
- Gauge, Rolling Mill.**
Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Boston Gear Works, Boston, Mass.
Poole, Robt. & Son Co., Baltimore, Md.
U. S. Projectile Co., Brooklyn, N. Y.
- Glass Boards.**
Canton Saw Co., Canton, O.
- Glass Cutters.**
Monce, S. G., Bristol, Conn.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glue.**
Raeder, Adamson & Co., Phila., Pa.
Dodd, A. W. & Co., Gloucester, Mass.
Russell Cement Co., Gloucester, Mass.
- Grass Catchers.**
Supplee Hardware Co., Phila., Pa.
- Grinding and Polishing Machines.**
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.
- Grinding Mills.**
Foos Mfg. Co., Springfield, O.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
- Gun Implements.**
Union Hdw. Co., Torrington, Conn.
- Gunpowder. Makers of.**
Lahin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Handles.**
New York Mallet and Handle Wks., 466 E. Houston St., N. Y.
- Hangers, Door.**
Chicago Spring Butt Co., Chicago, Ill.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Lane Bros., Poughkeepsie, N. Y.**
Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**
Doehner, Martin, 88 Chambers, N. Y.
Field, Alfred & Co., 93 Chambers St., N. Y.
Grady, John H. & Co., 111 Chambers St., New York
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Clarke, Thomas, St. John, N. B.
Graham, John H. & Co., 113 Chambers, McCoy, Jos. F. Co., 26 Warren St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Belden Machine Co., New Haven, Conn.
Berger Bros., Philadelphia, Pa.
Clark Mfg. Co., Buffalo, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwinner Mfg. Co., Hamilton, O.
Haines & Zimmermann, Phila., Pa.
Johnson, S. C., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Welland, Chas. & Co., Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
- Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Holsting Machines.**
Jox, Alfred & Co., 314 Green, Phila.
Jrown Holsting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E., Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 98 Liberty, N. Y.
Maris & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila., and N. Y.
Spindel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.
- Hollow Ware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
- Horse Nails, Makers of.**
Capewell Horse Nail Co., Hartford, Conn.
National Horse Nail Co., Vergennes, Vt.
Punnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes. Makers of.**
Bryden Horse Shoe Co., Catsasauqua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.
- Hose.**
Cleveland Rubber Works, Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 10 Park Row, N. Y.
- Hose Clamps.**
Clancy, J. R., Syracuse, N. Y.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Forging.**
U. S. Projectile Co., Brooklyn, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
Clement & Dunbar, Phila., Pa.
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
Tamm, S. C. & Co., Cincinnati, Ohio.
Whit, Mountain & Freezer Co., Nassau, N. H.
- Injectors.**
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., New York
Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance, Boiler.**
Hartford Steam Boiler Inspection & Insurance Co., Hartford Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**
Corning, Edw. & Co., 29 B'way, N. Y.
Ootton, Barclay W. & Co., Phila.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Keeley, Jerome & Co., Philadelphia.
Lea, J. Tatnall & Co., Philadelphia.
Mohr, J. J., 480 Walnut, Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Wister, L. & H. & Co., Phila., Pa.
- Iron Ore.**
Naylor & Co., 45 Wall, N. Y.
Samuel, Frank, Philadelphia, Pa.
- Iron. Merchants.**
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Busseus & Cunliffe, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Barclay W. & Co., Phila.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 446 West St., N. Y.
Navlor & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pierston & Co., 29 Broadway, N. Y.
Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.
- Iron. Importers.**
Abbott Wheelock & Co., N. Y. and Boston
Lundberg, Gustaf, Boston, Mass.
- Iron. Sheet. Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge Ohio
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork. Ornamental.**
Barium, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foos & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Kettle Bottoms.**
Diamond Hdw. Co., Boston, Mass.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladders, Rolling.**
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Ladies.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamps.**
Plume & Atwood Mfg. Co., New York.
Standard Lighting Co., Cleveland, O.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
Plume & Atwood Mfg. Co., 18 Murray Street, New York.
- Lanterns.**
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**
Johnson, S. C., Racine, Wis.
- Lawn Mowers.**
Blair Mfg. Co., Springfield, Mass.
Chadborn & Coldwell mfg. Co., Newburgh, N. Y.
Champion Mfg. Co., Richmond, Ind.
Coldwell Lawn Mower Co., Newburg, N. Y.
Dille & Anderson, Richmond, Ind.
Dille & McGuire Mfg. Co., Richmond, Ind.
Enterprise Mfg. Co., Philadelphia, Pa.
F. & N. Mfg. Co., Richmond, Ind.
Hendley, M. C., Richmond, Ind.
Mast, Foos & Co., Springfield, O.
Philadelphia Lawn Mower Co., Philadelphia, Pa.
Stearns, S. C. & Co., Syracuse, N. Y.
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, Ohio.
Kohler, F. E. & Co., Canton, O.
Schaeffer & Co., Dayton, Ohio.
- Lawn Sprinklers.**
Ette & Henger Mfg. Co., St. Louis, Mo.
Gibbs Mfg. Co., Canton, Ohio.
McGowan, John H. Co., Cincinnati O.
Portland Lawn Sprinkler Co., Portland, Me.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, O. F., & Son Athol, Mass.
- Locks & Knobs. Manufacturers of.**
Deltz, A. E., 97 Chambers, N. Y.
Reading Hdw. Co., Reading, Pa.
Smith & Edge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.

See Alphabetical Index, Pages 103 & 106.

Machinery.

Am. Tool Works, Cleveland, Ohio.
Barnes, W. F. & John, Rockford, Ill.
Sement, Miles & Co., Philadelphia, Pa.
Bislow, C. E., 45 Day, N. Y.
Signal & Keeler Mfg. Co., St. Louis.
Birmingham Iron Foundry, Birmingham, Conn.

Bliss, E. W. Co., Brooklyn, N. Y.
Robert, Jno. L., Flushing, N. Y.
Bridgeport Mch. Tool Works, Bridgeport, Conn.
Briggs, Marvin, 12 Broadway, N. Y.
Carlin's Sons, Thos., Allegheny, Pa.
Cinn. Milling Mch. Co., Cincinnati, Ohio.

Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
Detroit & Harvey Mch. Co., Baltimore, Md.
Fitchburg Mch. Works, Fitchburg, Mass.

Garvin Mch. Co., Laight & Canal St.
Gould & Eberhardt, Newark, N. J.
Hamilton Mch. Tool Co., Hamilton, O.
Harrington, E. Son & Co., Phila. Pa.
Henderson, A. L., Wilmington, Del.
Hendy Machine Co., Torrington, Ct.

Hill, Clarke & Co., Boston, Mass.
Howard & Morse, 45 Fulton St., N. Y.
Hubert-Rogers Mch. Co., South Sudbury, Mass.

Johnson, Israel H., Jr., & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Lovegrove & Co., Philadelphia, Pa.

McCabe, J. J., 68 Cortlandt, N. Y.
Machinists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., Waterbury, Conn.

National Machinery Co., Timm, Ohio.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
Niles Tool Wks., 188 Liberty St., N. Y.

Pittsburgh Mfg. Co., Pittsburgh, Pa.
Pole, Geo., 120 Broadway, N. Y.
Pope, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.

Pratt & Whitney Co., Hartford, Conn.
Prentiss Tool & Supply Co., N. Y.
Scranton Supply & Mchry. Co., Scranton, Pa.

Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia, Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., La., Phila.

Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wilkes Bros., Saginaw, Mich.
Wilson, W. A., Rochester, N. Y.

Machinery for Hardware Manufacture.
Adt, Jno. & Son, New Haven, Conn.

Machine Knives.
Loring Coes & Co., Worcester, Mass.
Loyd, John, 558-562 Water St., N. Y.

Machine Tools.—See Machinery.
Machine Work.
Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S. & Co., New York, N. Y.
Valentine Tool Co., Hartford, Conn.

Machinists' Tools and Supplies.
King, J. M. & Co., Waterbury, N. Y.
Sellers, Wm. & Co., Inc., Phila.

Mallets.
N. Y. Mallet & Handle Works, N. Y.

Mangles.
Johnson, S. C., Racine, Wis.

Manufacturing Sites.
Illinois Central R. R., Chicago, Ill.

Measuring Tapes.
Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.

Mechanical Instruction.
Correspondence School of Mechanics
Scranton, Pa.

Metals.
Fearing, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
Naylor & Co., 45 Wall, N. Y.

Metal Brokers.
American Metal Co., N. Y.

Metallurgists.
Britton J. Blodgett, Phil

Milling Machines.
Cin. Milling Mch. Co., Cincinnati, Ohio.

Mining Knives.
Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.
Darby, Edw. & Sons Phila. Pa.
Leonard, B. E., Scranton, Pa.

Mining Screens.
Harrington & King Perforating Co., Chicago, Ill.
Howard & Morse, 45 Fulton, N. Y.

Models, Makers of.
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.
Rhodes, L. E. Co., Hartford, Conn.

Model Platers' Supplies.
Eddy Electric Mfg. Co., Windsor, Conn.
Eaton & Van Winkle Co., Newark, N. J.
Zucker & Levett Chemical Company, 10 to 14 Grand St., N. Y.

New Shapes, Rollers of.
Lowland, William & Harvey, Framford, Philadelphia

Novelty Manufacturers.
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.

Nuts, Machines.
Jouham Nut Mch. Co., Unionville, O.

Nuts, Bolts, & Co., Makers of.
American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.
Hake & Johnson, Waterbury, Conn.
Eastern Forge Co., Boston, Mass.
Jaschell, Wm. H. Co., Pawtucket, R. I.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.
Pennsylvania Bolt & Nut Co., Lebanon, Pa.

Oil Cans and Lubricators.
Sherwood Mfg. Co., Buffalo, N. Y.

Oilers.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Oil Stones.
Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.
Glasier Stove Co., Chelsea, Mich.

Ores.
Wister, Francis, Philadelphia, Pa.

Presses.
Scranton Forging Co., Scranton, Pa.

Presses, Dies, & Co.
Morison, Robt., St. Louis, Mo.
N. Y. Belting & Packing Co., Ltd., N. Y.

Presses, Dies, & Co.
Ames Sword Co., Chicopee, Mass.
Fram, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.

Presses, Dies, & Co.
Richmond Cedar Wks., Richmond, Va.

Presses, Dies, & Co.
Dixon, Jos. Crucible Co., Jersey City, N. J.
Garry Iron & Steel Roofing Co., Cleveland, O.

Presses, Dies, & Co.
Faint Burners.
Dangler Stove & Mfg. Co., Cleveland, O.

Presses, Dies, & Co.
Paint Cans.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Presses, Dies, & Co.
Pants Stretcher.
Covert Mfg. Co., West Troy, N. Y.

Presses, Dies, & Co.
Patent Solicitors.
Howson & Howson, Phila. & Wash'ton.
Jenner, H. W. T., Washington, D. C.
Stocking, E. B., Washington, D. C.

Presses, Dies, & Co.
Perforated Metal.
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Presses, Dies, & Co.
Phosphor Bronze.
Phosphor Bronze Smelting Co., Limited, 612 Arch, Philadelphia.

Presses, Dies, & Co.
Phosphor Tin.
Orescent Phosphorized Metal Co., Philadelphia, Pa.
Haik & Naumann, 616 Pearl, N. Y.

Presses, Dies, & Co.
Plates and Mattocks.
Pumo, Fayette K., Philadelphia, Pa.

Presses, Dies, & Co.
Pig Forceps.
Reimers, J. N., Davenport, Ia.

Presses, Dies, & Co.
Pis Iron.
Houston, C. B. & Co., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Naylor & Co., 45 Wall, N. Y.
Pilling & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.

Presses, Dies, & Co.
Pis Iron Storage.
Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

Presses, Dies, & Co.
Pile Drivers.
Vulcan Iron Wks., Chicago, Ill.

Presses, Dies, & Co.
Pipe Bent.
National Pipe Bending Co., New Haven

Presses, Dies, & Co.
Pipe Cutting and Threading Machines.
Signal & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Pancoast Henry B. & Co., Philadelphia.
Saunders's Sons, D. Yonkers, N. Y.

Presses, Dies, & Co.
Pipe Grips.
Prentiss Vise Co., 44 Barclay, N. Y.

Presses, Dies, & Co.
Mahoning Valley Iron Co., Youngstown, Ohio.
McGorhead-McLean Co., Pittsburgh, Pa.
Mollvain & Sons, Reading, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottsville Iron & Steel Co., Pottsville, Pa.

Presses, Dies, & Co.
Singer, Nimick & Co., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, Ohio.
Wellman Iron & Steel Co., Thurlow, Pa.
Wood Alan Co., Philadelphia.

Presses, Dies, & Co.
Plating, Nickel, Brass and Silver.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Presses, Dies, & Co.
Plov Shares.
Star Mfg. Co., Carpentersville, Ill.

Presses, Dies, & Co.
Polishing Machines.
Watson & Stillman, 204 E. 43d, N. Y.

Presses, Dies, & Co.
Post Hole Diggers.
Buckeye Mfg. Co., Union City, Ind.
Graham, Jno. H. & Co., 115 Chambers St., N. Y.

Presses, Dies, & Co.
Poultry Nettings.
Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Foley, J. W. & Co., Cincinnati, O.

Presses, Dies, & Co.
Pulley Fixings.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Hooker-Colville Steam Pump Co., St. Louis, Mo.

Presses, Dies, & Co.
Pulley Fixings.
Lucas, C. O. & Co., Greenville, Ohio.
McGowan, J. B. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Southwark Fdy. & Mch. Co., Phila., Pa.
Valley Pump Wks., Easthampton, Mass.
Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Fumps, Makers of.
Bellevue Pump Co., Bellevue, Iowa.
Deming Co., Salem, U.
Douglas, W. & B., Middletown, Conn.
Masl, Foss & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.

Presses, Dies, & Co.
Pulley Fixings.
Punches and Shears, Hand and Power.
E. W. Bliss Co., Brooklyn, N. Y.
Cockburn Barrow & Mch. Co., Jersey City, N. J.

Presses, Dies, & Co.
Pulley Fixings.
Crosby, G. A. & Co., Chicago, Ill.
Ferracute Mch. Co., Bridgeton, N. J.
Henderson, A. L., Wilmington, Del.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Wicks & Roos Punch & Shear Co., Cincinnati, Ohio.
Waterbury, Chas. Foundry and Mch. Co., Waterbury, Conn.
Watson & Stillman, 204 E. 43d, N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Rails, Old and New.
Perry, W. H. & Co., Providence, R. I.

Presses, Dies, & Co.
Pulley Fixings.
Rat and Mouse Traps.
Estey, W. S., 65 Fulton, N. Y.
Ripley Mfg. Co., Unionville, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Razors.
Electric Outlery Co., 113 Chambers, N. Y.
J. R. Torrey Razor Co., Worcester, Mass.

Presses, Dies, & Co.
Pulley Fixings.
Reels.
Hendryx, A. B. Co., New Haven, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Refrigerator Door Fasteners.
Conroy, P. J. & Co., Philadelphia.

Presses, Dies, & Co.
Pulley Fixings.
Refrigerators.
Challenge Corn Planter Co., Grand Haven, Mich.
Monroe Refrigerator Co., Lockland, O.

Presses, Dies, & Co.
Pulley Fixings.
Rivers.
Blake & Johnson, Waterbury, Conn.
Boyce Rivet Co., Muncie, Ind.
Burden Iron Co., Troy, N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Riveting Machines.
Adt, Jno. & Sons, New Haven, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Rock Drills.
Rand Drill Co., 23 Park Place, N. Y.

Presses, Dies, & Co.
Pulley Fixings.
Rolling Mill Machinery.
Birmingham Iron Fdry, Birmingham, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Rolling Mill Machinery.
Booth, The Lloyd Co., Youngstown, O.
Leachburg Foundry & Mch. Co., Pittsburgh, Pa.
Mahoning Fdry & Mch. Co., Danville, Pa.
Morgan Construction Co., Worcester, Mass.

Presses, Dies, & Co.
Pulley Fixings.
Rolling Mill Machinery.
Robinson-Rea Mfg. Co., Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Presses, Dies, & Co.
Pulley Fixings.
Rolling Mill Machinery.
Trotter Mfg. Co., Pittsburgh, Pa.
Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Presses, Dies, & Co.
Pulley Fixings.
Roll Lathes.
Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Presses, Dies, & Co.
Pulley Fixings.
Rolls, Chilled, Sand and Steel.
Booth, The Lloyd Co., Youngstown, O.
Garrison, A. Fdry Co., Pittsburgh, Pa.
Seaman, Sneath & Blak, Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Presses, Dies, & Co.
Pulley Fixings.
Roofing.
Berlin Iron Bridge Co., E. Berlin, Conn.
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Johns H. W. Mfg. Co., 37 Madison Lane, N. Y.
Iron Roofing & Corrugating Co., Jersey City, N. J.

Presses, Dies, & Co.
Rope and Web Goods.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Rope Wheels.
Cresson, Geo. V. Co., Philadelphia, Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Rubber Goods.
Canfield, H. O., Bridgeport, Conn.

Presses, Dies, & Co.
Rope and Web Goods.
Rules, Manufacturers of.
Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.
Stanley Rule & Level Co., 29 Chambers, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Rust Preventive.
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Sand Paper.
Baeder, Adamson & Co., Phila., Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Balances.
Caldwell Mfg. Co., Rochester, N. Y.
Fulman Sash Balance Co., Rochester, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Balances.
Vanderbilt Sash Balance Co., Canandaigua, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Balances.
Morton, Thos., 65 Elizabeth, N. Y.
Osawan Mills Co., Norwich, Conn.
Samson Cordage Works, Boston, Mass.
Smith & Egge, Mfg. Co., Bridgeport.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Locks.
Columbian Sash & Door Lock Co., Wauseon, Ohio.
Ives, N. B. & Co., New Haven, Conn.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Pulleys.
Palmer Hardware Mfg. Co., Troy, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Sash Weights.
Brown, E. E. & Co., Philadelphia, Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Saw Filing Machines.
Diston, Henry & Sons, Philadelphia, Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Saws, Makers of.
Butler Mfg. Co., Boston, Mass.
Diston, Henry & Sons, Phila., Pa.
Diston, Henry & Sons, 86 Reade St., N. Y.
National Saw Co., 86 Reade St., N. Y.
Simonds Mfg. Co., Fitchburg, Mass.

Presses, Dies, & Co.
Rope and Web Goods.
Saw Vises.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Saw Yots.
Taintor Mfg. Co., 84-86 Chambers, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Scales, Manufacturers of.
Buffalo Scale Co., Buffalo, N. Y.
Chattillon, John & Sons, 85-89 Cliff, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Scrapers, Road.
Am. Steel Scraper Co., Sidney, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.

Presses, Dies, & Co.
Rope and Web Goods.
Screens, Coal and Ore.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Screens, Door and Window.
Phillips, A. J. & Co., Fenton, Mich.

Presses, Dies, & Co.
Rope and Web Goods.
Screw Cutting Machinery.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Presses, Dies, & Co.
Rope and Web Goods.
Screw Drivers.
Brown, R. H. & Co., New Haven, Conn.
Mayhew, A. H. Co., Shelburne Falls, Mass.

Presses, Dies, & Co.
Rope and Web Goods.
Screw Plate and Pipe Cutter.
Jarecki Mfg. Co., Erie, Pa.

Presses, Dies, & Co.
Rope and Web Goods.
Screws, Makers of.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Wm. H. Haskell Co., Pawtucket, Mass.

Presses, Dies, & Co.
Rope and Web Goods.
Screws, Makers of.
Miles, F. S., 205 Quarry, Philadelphia.
New England Screw Co., Boston, Mass.
Reynolds & Co., New Haven, Conn.
Worcester Machine Screw Co., Worcester, Mass.

Presses, Dies, & Co.
Rope and Web Goods.
Serrail Saws.
Barnes, W. F. & John, Rockford, Ill.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Seythe Stones and Whetstones.
Pike Mfg. Co., Pike Station, N. H.
Cleveland Stone Co., Cleveland, O.

Presses, Dies, & Co.
Rope and Web Goods.
Shafting, Makers of.
Cresson, Geo. V. Co., Philadelphia, Pa.
Fairmount Mch. Co., Philadelphia, Pa.
Fitzsimons & Co., Cleveland, Ohio.
Sellers, Wm. & Co., Inc., Phila. Pa.
Stow, Co. Mfg., Binghamton, N. Y.

Presses, Dies, & Co.
Rope and Web Goods.
Shaped Iron and Steel, Manufacturers of.
Extra-Standard Iron & Steel Co., Bridgeport, O.

Presses, Dies, & Co.
Rope and Web Goods.
Shaping Machines.
Adt, Jno. & Sons, New Haven, Conn.

Presses, Dies, & Co.
Rope and Web Goods.
Shaping Machines.
Rand Drill Co., 23 Park Place, N. Y.

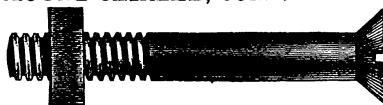
- Allentown Rolling Mill.** Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Pottsville Rolling Mill Co., Paterson, N. J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
- Shears and Scissors.**
Aame Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Atna-Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburgh, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pierson & Co., 20 Broadway, N. Y.
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Slabs.**
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**
Dame, Stoddard & Kendall, Boston, Mass.
Lovell, Jno. P. Arms Co., Boston, Mass.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Benley, M. C., Richmond, Ind.
Union Hardware Co., Torrington, Conn.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 780 S. Broad, Phila.
- Soldering Coppers.**
Clendenin Bros., Baltimore, Md.
Covert Mfg. Co., West Troy, N. Y.
- Speaking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Rhodes, L. E. Co., Hartford, Conn.
- Spelter.**
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Spools and Ferks.**
Boardman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Bogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 B'way, N. Y.
- Springs.**
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Roland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**
Chicago Spring Butt Co., Chicago, Ill.
Fulman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
Bristol Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia.
Dudgson, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburgh, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N. J.
- Steam Separators.**
Gouert Mfg. Co., 32 Cortland St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
- Steel, Cold Rolled Strip.**
Superior Steel Co., Pittsburgh, Pa.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Hoefig, C. W., 52 Fulton St., N. Y.
Hogson & Pettis Mfg. Co., New Haven, Conn.
Knorrud, W., 41 Fulton St., N. Y.
Wolf, C. H., 177 William St., N. Y.
- Steel Importers.**
Abbott, Wheelock & Co., N. Y. and Boston.
Robson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Vetherell Bros., 93 Liberty St., N. Y.
Whitney, A. B. & Co., B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Atna-Standard Iron & Steel Co., Bridgeport, O.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Eiken & Co., Hagen, Germany.
Gautier Steel Department or Cambria Iron Co., Johnstown, Pa.
Robson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Kayser, Ellison & Co., Sheffield, England, or 91 John, N. Y.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Moss, F. W., 83 John, N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Pittsburgh.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Superior Steel Co., Pittsburgh, Pa.
Valley Steel Co., St. Louis, Mo.
Wordlaw S. & Co., Sheffield, Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**
Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 20 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Batterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stove Linings.**
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
Cheney, S. & Son Manlius, N. Y.
- Stove Trucks.**
Gwinner Mfg. Co., Hamilton, O.
- Street Lamps.**
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
Electric Cutlery Co., 113 Chambers, N. Y.
J. R. Torrey & Co., Worcester, Mass.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Clendenin Bros., Baltimore, Md.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
- Taps and Dies.**
Batterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Rieble Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Rieble Bros. Testing Mch. Co., Phila.
- Theatrical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Timber and Mineral Land.**
Robertson, E. Co., Cincinnati, O.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngtown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St.
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**
Burke, P. F., Boston, Mass.
- Tool Blocks.**
Hulbut-Rogers Mch. Co., South Sudbury, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Franks Co., 19 Warren St., New York.
Mayhew, H. H. Co., Shelburne Falls, Mass.
Millers Falls Co., 93 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, New York.
Starratt, L. S., Athol, Mass.
Tower & Lyon, 95 Chambers St., N. Y.
Wilkinson, A. J. & Co., Boston, Mass.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway, Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters.**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasolene.**
Dangler Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.
- Transom Lifters.**
Wollensak, J. F., Chicago, Ill.
- Tricycles.**
Toledo Metal Wheel Co., Toledo, Ohio.
- Trucks, Manufacturers of.**
Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Ellwood Shafting & Tube Co., Ellwood City, Pa.
Leng's John S. Son & Co., 4 Fletcher St., New York.
Shelby Steel Tube Co., Shelby, O.
U. S. Projectile Co., Brooklyn, N. Y.
- Tumbling Barrels.**
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
Lunkenheimer Co., Cincinnati, O.
McNab & Harlin Mfg. Co., 55 John, N. Y.
- Ventilating Fans.**
Huyett & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Athol Machine Co., Athol, Mass.
Capital Mch. Tool Co., Auburn, N. Y.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay St., N. Y.
Tower & Lyon, 95 Chambers St., N. Y.
Van Wagoner & Williams Co., Warren St., N. Y.
- Wagon Jacks.**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Washing Machines.**
Benbow Mfg. Co., St. Louis, Mo.
Richmond Cedar Works, Richmond, Va.
- Water Meters.**
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.**
Amer. Steel Scraper Co., Sidney, Ohio.
Byran Mfg. Co., Byran, Ohio.
Cockburn Barrow & Mch. Co., Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.
Sweatt Mfg. Co., Minneapolis, Minn.
Toledo Wheelbarrow Works, Toledo, Ohio.
Withington & Cooley Mfg. Co., Jackson, Mich.
- Window Cleaners.**
Bourke Mfg. Co., Youngstown, O.
- Window Cord, Makers of.**
Samsom Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester.
Wetherell Bros., 93 Liberty St., F. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Eatey, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleveland.
- Wire Cutters.**
Higginum Edw. Co., Higginum, Conn.
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Osaway Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Bond Nail Co., Raynham, Mass.
Indiana Wire Fence Co., Crawfordville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, Townsend & Co., Phila.
Salem Wire Nail Co., Salem, O.
Taunton Wire Nail Co., Taunton, Mass.
Whitney, A. R. & Co., New York, O.
- Wire Rops, Steel.**
New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Wire Rope, Iron and Steel Makers.**
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hasard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
- Wood-Working Machinery.**
Fay, J. A. & Egan Co., Cincinnati, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Wilkinson, A. J. & Co., Boston, Mass.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Coe's Wrench Co., Worcester, Mass.
Tower & Lyon, 95 Chambers St., N. Y.
Trimm Mfg. Co., Roxbury, Mass.
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- Wringers.**
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Ames Sword Co.....	86	Butterfield & Co.....	44	Dean Bros. Steam Pump Works.....	35	Hardware Board of Trade.....	55
Andre, T. J.....	95	Butts & Ordway.....	40	Deitz, A. E.....	93	Harrington, E. Son & Co.....	49
Ansonia Brass & Copper Co.....	2	Byram & Co.....	27	Deming Co.....	62	Harrington & King Perforating Co.....	13
Arcade File Works.....	66	C. & C. Electric Co.....	29	Detrick & Harvey Machine Co.....	49	Harrington & Richardson Arms Co.....	73
Arcade Malleable Iron Co.....	22	Caldwell Mfg. Co.....	86	Detroit Foundry Equipment Co.....	28	Harrison Safety Boiler Wks.....	31
Armstrong Mfg. Co.....	43	California Wire Works.....	6	Diamond Clamp & Flask Co.....	108	Hart Mfg. Co.....	44
Artificial Gas Engineering Co.....	26	Cambria Iron Co.....	18	Diamond Hardware Co.....	81	Hartford Steam Boiler Insp. and Ins.	
Ashcroft Mfg. Co.....	30	Cambridge Iron & Steel Co.....	22	Diamond State Iron Co.....	39	Co.....	32
Athol Machine Co.....	63	Cambridge Roofing Co.....	14	Dienelt & Eisenhardt.....	41	Hartley & Graham.....	1
Atlas Mfg. Co.....	87	Canfield, H. O.....	37	Dille & Anderson.....	99	Haskell, Wm. H. Co.....	100
Atlas Tack Corporation.....	19	Canton Saw Co.....	66	Dille & McGuire Mfg. Co.....	98	Hazard Mfg. Co.....	6
Babcock & Wilcox Co.....	34	Capewell Horse Nail Co.....	90	Disston, Henry & Sons.....	65	Heinisch's R. Sons Co.....	69
Raeder, Adamson & Co.....	60	Capital Machine Tool Co.....	62	Dixon, Jos., Crucible Co.....	37	Henderer, A. L.....	38
Banker & White.....	67	Carbon Steel Co.....	19	Dodd, A. W. & Co.....	107	Henderson Bros.....	24
Bardsley, J.....	92	Carlin's Sons, Thomas.....	52	Donaldson Iron Co.....	25	Hendey Machine Co.....	58
Barns, C. K. & Co.....	20	Carpenter, J. M. Tap & Die Co.....	107	Doscher, Martin.....	69	Hendricks Bros.....	2
Barnes, W. F. & John.....	39	Cary Mfg. Co.....	76	Douglas, W. & B.....	62	Hendrick Mfg. Co., Ltd.....	7
Barnett, G. & H.....	67	Chadborne & Coldwell Mfg. Co.....	98	Draper Machine Tool Co.....	52	Hendryx, A. B. Co.....	3
Barnum, E. T.....	10	Challenge Corn Planter Co.....	80	Dudgeon, Richard.....	62	Henley, M. C.....	74&98
Bass Foundry & Machine Works.....	31	Chambers Bros. Co.....	100	Dunbar Bros.....	5	Herrick & Cowell.....	36
Bay State Stamping Co.....	50	Champion Blower & Forge Co.....	44	Dunham Nut Machine Co.....	50	Herrick, J. A.....	27
Belden Machine Co.....	39	Champion Iron Co.....	7	Dupont Mfg. Co.....	38	Hertz, T. & Son.....	4
Bellevue Pump Co.....	63	Champion Mfg. Co.....	97	Durant, W. N.....	42	Higginum Hdw. Co.....	64
Bement, Miles & Co.....	41	Chandler & Taylor Co.....	28	Dwight Slate Machine Co.....	43	Hillebrand & Wolf.....	38
Bemis & Call Hardware & Tool Co.....	92	Chapman Valve Mfg. Co.....	29	Eagle Anvil Works.....	66	Hill, Clarke & Co.....	53
Benbow Mfg. Co.....	78	Chatillon, John & Sons.....	78	Eagle Bicycle Mfg Co.....	107	Hobson, F., Seaman & Co.....	17
Berger Bros.....	78	Cheney, S. & Son.....	22	Ealy, John W. Co.....	57	Hoeg, C. W.....	67
Berlin Iron Bridge Co.....	9	Chess Bros.....	22	Eastern Forge Co.....	13	Hoffman, C & A.....	68
Best, Fox & Co.....	3	Chester Steel Casting Co.....	24	Eccles, Richard.....	87	Hoffman, J. W. & Co.....	16
Bethlehem Iron Co.....	20	Chicago Spring Butt Co.....	86	Eddy Electric Mfg. Co.....	29	Hogan, John L. & Co.....	16
Bevin Bros. Mfg. Co.....	75	Chrome Steel Works.....	23	Edge Moor Iron Co.....	25	Hoggson & Pettis Mfg. Co.....	44
Bickford Drill & Tool Co.....	47	Church, Isaac.....	100	Eicken & Co.....	18	Hollands Mfg. Co.....	63
Bicycle Step Ladder Co.....	77	Cincinnati Corrugating Co.....	12	Electric Cutlery Co.....	70	Holmes & Edwards Silver Co.....	71
Bigelow, C. R.....	53	Cincinnati Mfg. Co.....	81	Ellwood Shafting & Tube Co.....	16	Hooker-Colville Steam Pump Co.....	53
Bigall & Keeler Mfg. Co.....	41	Cincinnati Milling Mch. Co.....	50	Enterprise Mfg. Co. of Pa.....	79	Houston, C. B. & Co.....	16
Billings & Spencer Co.....	92	Claden Mfg. Co.....	37	Erie Engine Works.....	30	Howard Iron Works.....	61
Bingham, W. Co.....	75	Clancy, J. R.....	69	Estey, W. S.....	6	Howard & Morse.....	7
Birmingham Iron Foundry.....	22	Clapp, Geo. M.....	53	Ette & Henger Mfg. Co.....	96	Howson & Howson.....	6
Bissell, E. Son & Co.....	55	Clark, G. P.....	96	Eureka Cast Steel Co.....	108	Hulbut-Rogers Mch. Co.....	47
Blair Mfg. Co.....	96	Clark & Cowles.....	6	Evans-Friction Cone Co.....	3	Huyett & Smith Mfg. Co.....	40
Blake & Johnson.....	12	Clark Mfg. Co.....	77	Eynon-Evans Mfg. Co.....	32	Ideal Machine Works.....	50
Bliss Co., E. W.....	38	Clarke, Thomas.....	71	F. & N. Mfg. Co.....	98	Ideal Mfg. Co.....	75
Boardman, L. & Son.....	71	Clauss Shear Co.....	70	Fairmount Machine Co.....	98	Illinois Central R. R.....	55
Bogert, John L.....	59	Clement & Dunbar.....	61	Fay, J. A. & Egan Co.....	47	Illinois Pure Aluminum Co.....	77
Boker, Hermann & Co.....	17	Clendenin Bros.....	14	Fearing, Wm. S.....	2	Indiana Bicycle Co.....	73
Bond Nail Co.....	12	Cleveland Block Co.....	87	Ferracute Machine Co.....	40	Indiana Wire Fence Co.....	7
Boone, W. C. Mfg. Co.....	24	Cleveland City Forge & Iron Co.....	1	Fitch, W. & E. T.....	107	Ives, H. B. & Co.....	36
Booth, The Lloyd Co.....	25	Cleveland Rubber Works.....	82	Fitchburg Machine Works.....	36	Jacobus, W. H.....	100
Borden & Lovell.....	7	Cleveland Stamping & Tool Co.....	77	Fitzsimons & Co.....	16	Jarecki Mfg. Co.....	43
Borgner, Cyrus.....	25	Cleveland Stone Co.....	50	Flagg, Stanley G. & Co.....	108	Jeffrey Mfg. Co.....	36
Bourke Mfg. Co.....	76	Cleveland Twist Drill Co.....	46	Foley, J. W. & Co.....	47	Jenkins Bros.....	1
Box, Alfred & Co.....	47	Clinton Wire Cloth Co.....	8	Foss Mfg. Co.....	94	Jenkins & Lingle.....	39
Boyce Rivet Co.....	108	Cobb & Drew.....	6	Frankford Steel Co.....	18	Jenner, H. W. T.....	6
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		Covert's Saddlery Works.....	59	Goubert Mfg. Co.....	34	Koch, A. B. & Co.....	61
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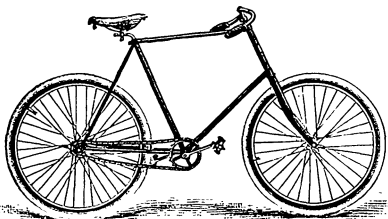
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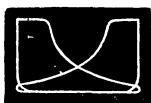
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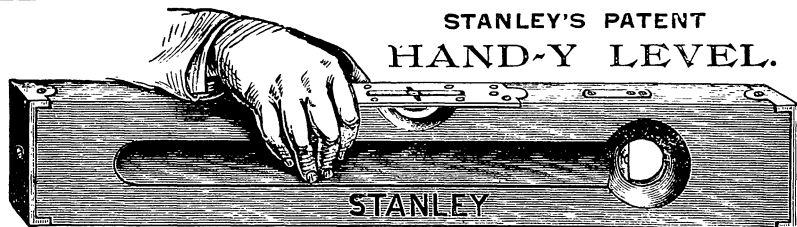
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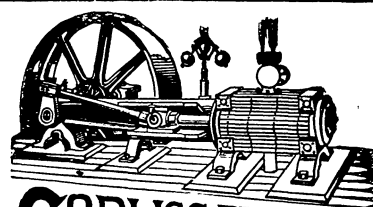
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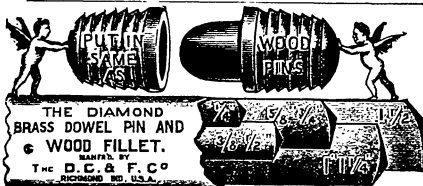
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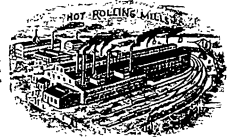
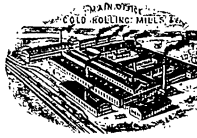
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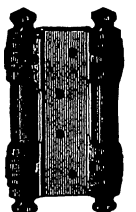
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THE IRON AGE

THURSDAY, FEBRUARY 15, 1894.

Hydraulic Testing Machines.

About six years ago William Sellers & Co., Incorporated, of Philadelphia acquired the exclusive right to build testing machines under the numerous patents granted to A. H. Emery. Since that time they have devoted much study to the subject with a view of improving and simplifying the mechanism, reducing the cost and increasing the facility of operation in order that they might be enabled to supply at a comparatively

Heretofore, the principal method has been by machines designed to test comparatively small sample pieces under such conditions that the breaking strength of the test piece was measured by the machine, and from the data thus obtained the supposed strength per square inch of full sized bridge members and other constructive material was determined on paper by calculation. A feature common to all such machines heretofore in use is, in principle, the common steelyard balance, supported by knife edge. While this

is not too much to say that these conditions have been fulfilled, and it is the purpose of this paper to describe briefly the wholly original marvelous machine devised a number of years ago by A. H. Emery, C.E., and recently improved by us as to its mechanical details.

The original machine of this type, constructed for the United States Government, has been in actual service at the arsenal at Watertown, near Boston, for ten years, and other similar machines more recently built have served

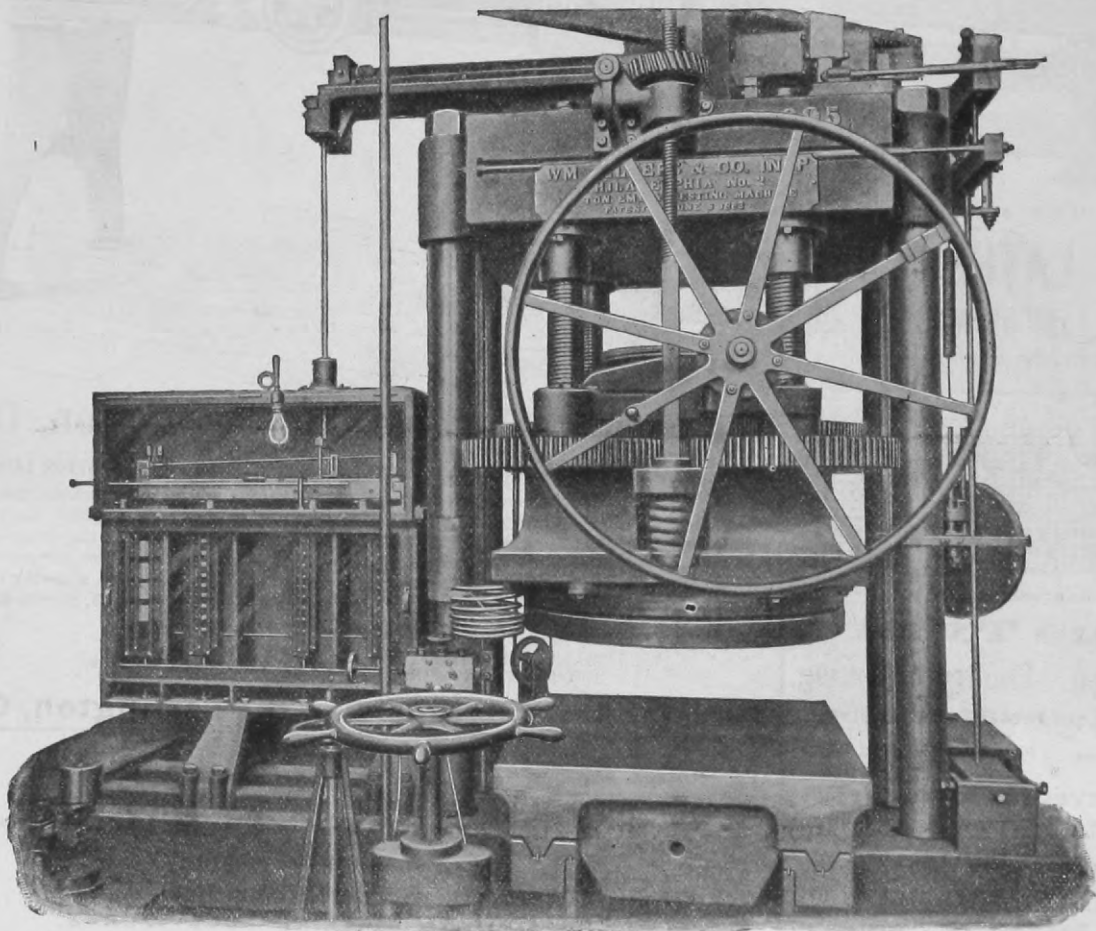


Fig. 1.

HYDRAULIC SUPPORT TESTING MACHINE.

moderate expense testing machines adapted to the needs of bridge constructors and other manufacturers, as well as technical schools and colleges, &c. It was found that extensive alterations in mechanical details were required before such machines could be economically produced, and the machines illustrated herewith present the latest forms, combining the essential features of the original invention with the added mechanical improvements.

The Emery Testing Machine.

We are indebted to the courtesy of William Sellers & Co., Incorporated, for the illustrations of four different styles of these machines. From a pamphlet just issued by them we take the following particulars:

is satisfactory for small work, it has proved inadequate for the modern requirements of testing a completed piece, such as a column or an eye bar forming a tension member of a bridge, by reason of the bending of the support under heavy pressure; also, the injury to the knife edge if sharp, and, if blunted, the introduction of friction, all of which renders the calculation required to measure the strain unreliable.

The "ideal" testing machine would be one working without friction, capable of engaging all sizes and weights, measuring and registering with accuracy, easily and quickly operated, and practically indestructible in any use for which it was designed.

Impossible as such a combination may appear to a technical engineer, it

to confirm the soundness of the principles involved.

One of the "proof" experiments by the United States Government Board was the breaking in tension of a forged iron link, 5 inches in diameter between the eyes, at a strain of 722,800 pounds, and immediately thereafter a single horse hair $\frac{1}{1000}$ inch in diameter was slowly strained, and, after stretching 30 per cent., snapped under the recorded strain of 16 ounces. Masses of metal were subjected to pressures of 1,000,000 pounds in compression alternately with eggs and nut shells, and in all cases the machine operated with equal accuracy. The accounts of the performances of the original Emery testing machine seemed at first incredible and served to attract scientific investigators from

all parts of the civilized world, and many foreign governments sent representatives to the United States Arsenal at Watertown to see the tests. The reports of these various observers all confirmed the earlier accounts and at once placed this Government in the front rank in the estimate of foreign nations in its facilities for accurately testing the physical qualities of iron, steel and other metals on a large scale. About six years ago the Sellers Company acquired the exclusive right to build this testing machine under the Emery patents, and have since that time devoted much study to the subject, with a view of improving and simplifying its mechanism, reducing its cost and increasing the facility of its operation in order that they might be enabled to supply at a comparatively moderate

arranged so that the pressure can be applied on either side of the piston as desired, in order to produce strains of compression or extension. The straining head is adjusted backward and forward on the bed, to suit the different lengths of specimen to be tested, by two nuts which revolve about the fixed straining screws. These nuts are driven by a balanced train of gearing that rotates each nut independently and thus delivers an equal pressure against each side of the head, and compensates for any irregularity in pitch which may exist in the two screws. The end of the piston rod projects through a stuffing box in the end of the cylinder next to the weighing head, and is provided with a screw thread on its end, which serves to secure the compression platform or the tension holder,

case may be. This draw bar carries between the two steel supporting plates two steel collars screwed firmly to the bar, provided on their exterior with projecting teeth, which alternate with corresponding teeth formed on and projecting from the interior of the two annular beams of the head. The ends of these projections, on both collar and annular beam, are faced to a true plane surface, perpendicular to the axis of the draw bar, and the annular hydraulic support which receives the load applied to the specimen and transmits it to the scale is carried between the plane surfaces formed by these projections. This hydraulic support consists of two annular pieces of sheet brass fastened together at their edges so as to form a metallic bag, the two sheets of brass being separated about 0.02 inch. They

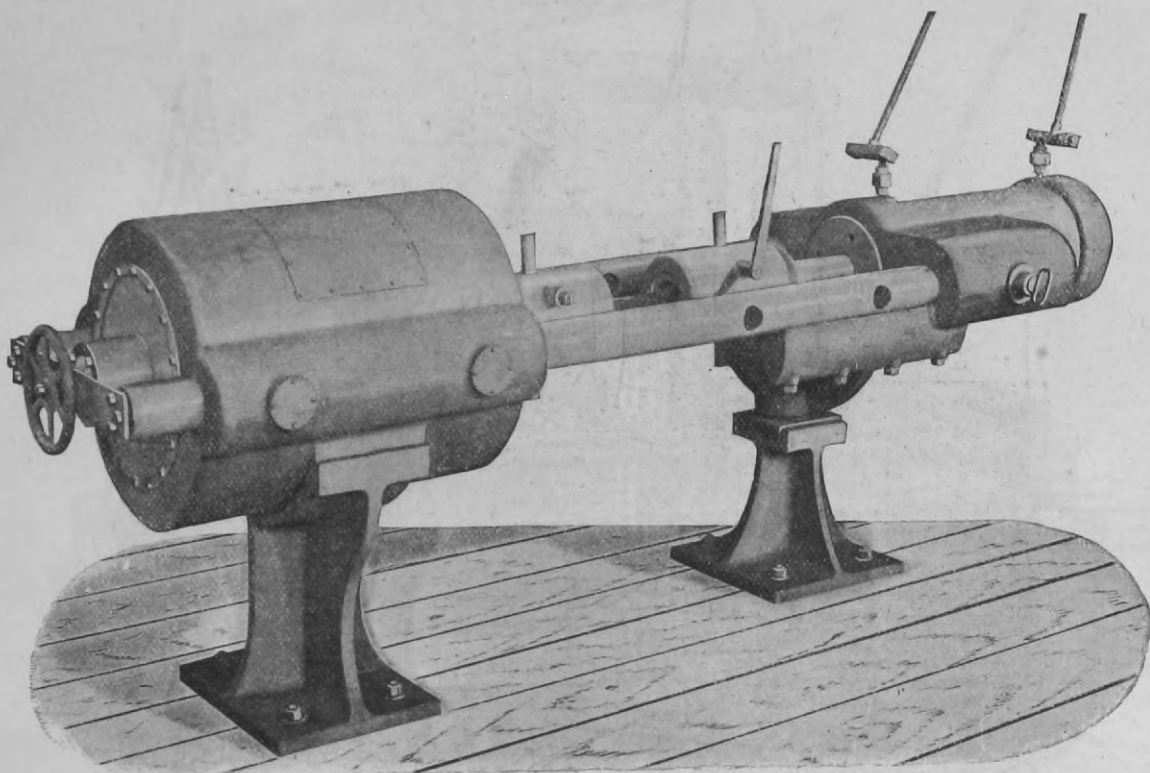


Fig. 2.

TESTING MACHINE, HORIZONTAL TYPE, 100,000 POUNDS.

expense testing machines adapted to the requirements of bridge constructors and other manufacturers, as well as technical schools and colleges, &c. It was found that extensive alterations in mechanical details were needed before such improved machines could be economically produced, and the machines illustrated herewith present the latest forms, combining the essential features of the original invention with the added mechanical improvements.

General Description.

The Emery hydraulic testing machine, as designed and built by William Sellers & Co., Incorporated, consists essentially of a fixed abutment called the "weighing head," and a movable abutment called the "straining head," connected by two steel straining screws, the two heads being mounted in the larger machines upon a horizontal wrought iron bed.

The straining head is a hydraulic cylinder provided with a piston and piston rod, the packings on the piston being

according as the specimen is to be tested for compression or extension.

The fluid is supplied to this straining cylinder through two jointed pipes, which are connected through the valves at the scale case with the supply pump and the supply tank, respectively, so that each pipe acts alternately as a pressure pipe or an exhaust pipe, depending upon the direction in which the strain is to be exerted upon the specimen.

The weighing head consists of two annular beams, through which the straining screws are firmly secured, and through the axis of these beams extends a draw bar, supported at each end of the weighing head by a flexible steel plate, which holds the draw bar firmly in the line of the axis of the testing machine, while permitting a free motion to a limited extent in the direction of the axis. The projecting end of this draw bar is provided with a screw thread similar to that on the end of the piston rod, by which the compression platform or the tension holder is secured to it, as the

are supported by and inclosed between two rings of cast iron. These rings are supported from the central draw bar by thin annular plates of steel, in the same way that the draw bar is carried from the beams of the straining head.

When pressure is exerted upon the draw bar through the specimen, this bar moves slightly in the direction of its axis, and the tooth projections on the collar on one end of the bar force one of these cast iron rings against the metallic bag; this pressure is resisted by the other cast iron ring, which then transmits its load to the projections formed on the interior of the annular beam at the opposite end of the straining head, thus preventing all further motion of this second cast iron ring. The strain on the specimen thus produces a pressure on the fluid contained within this metallic bag, which is transmitted through a small pipe to a metallic bag of much smaller area than that of the annular bag. This small bag is contained in the scale, and the pressure produced in

it is transmitted to a beam supported on frictionless steel fulcrum plates, and thence to the weigh beam, from which the poise weights are suspended in separate frames. The motion of the weigh beam is indicated by a long index, which moves about an inch for a load of 100 pounds applied on the end of the draw bar. The first poise frame on the beam contains poise weights representing 100 pounds each, the next 1000 pounds, the next 10,000 pounds and the last 100,000 pounds. The frames contain nine weights each, and by raising or lowering a hand lever connected with a frame, which encircles each poise frame, these weights may be successively added to, or removed from, the weigh beam as required, in order to balance the load and keep the needle at its zero point. Opposite to the zero point on the scale of the needle there is

transmitted directly to the hydraulic support—which it might in time rupture—is received through the cast iron ring, provided with a screw thread directly on the rear beam of the straining head. At the same time the straining head itself is free to move back and forth on the wrought iron bed to an extent limited by two compression springs held in stands secured to the wrought iron bed. These springs are connected to the extended ends of the straining screws in such a way that motion of the straining head in either direction on the bed tends to compress the springs, which are set under sufficient tension to return the straining head to its original position on the bed without shock. The revolving nuts which adjust the straining head to place have ample clearance between their abutment faces, so that this head, which merely rests

chine for supplying the fluid to the straining cylinder is provided with a link motion, by which the stroke of the three plungers, which are placed at an angle of 120° from each other, may be regulated to any point between 5-inch stroke and zero, so that the action of the pump may be entirely stopped by the link motion alone. This enables the operator to adjust the pump exactly to the requirements of any specimen that he may have to test.

Data of Machines Illustrated.

The hydraulic support testing machine, shown in Fig. 1, is a costly special apparatus, illustrated in plate No. 5, designed and used exclusively for calibrating all new testing machines. By means of this instrument known pressures are applied to the annular hydraulic support or metallic bag of each

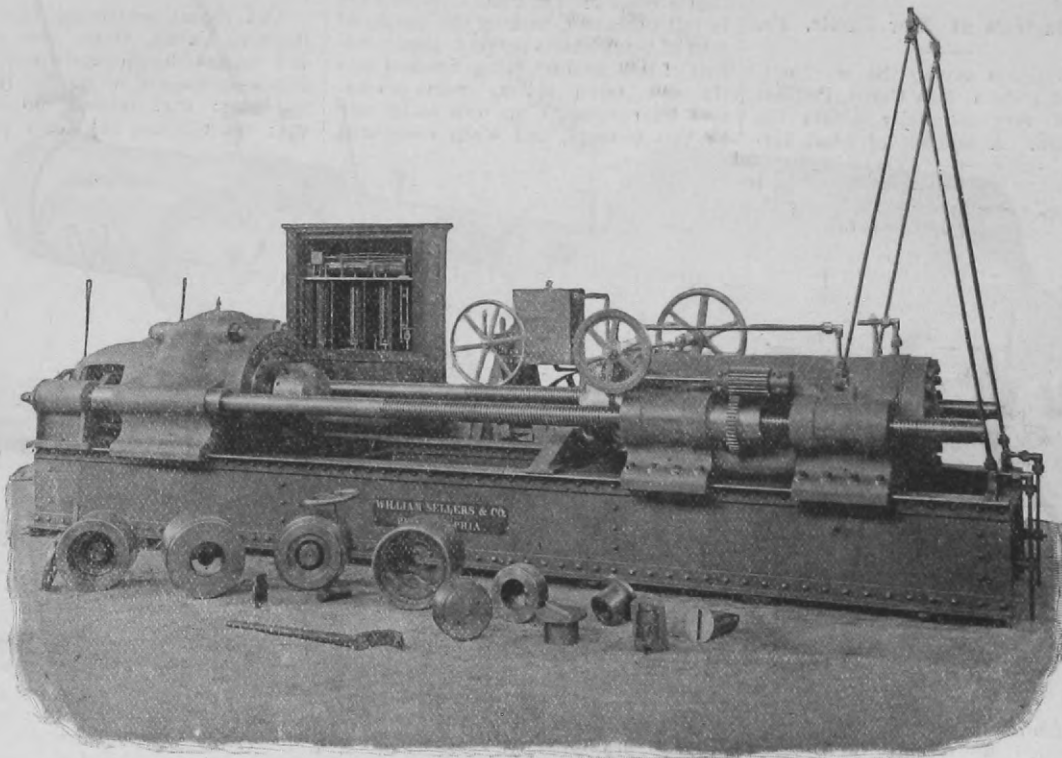


Fig. 3.

TESTING MACHINE, HORIZONTAL TYPE, 200,000 POUNDS.

a slot in the plate, through which the operator reads instantly, in figures, the amount of the pounds strain that is applied to the specimen at any instant; he does not have to reckon a number of weights which have been applied, but simply to take the reading of the figures shown through this opening.

In order to prevent all risk of injury to the machine from the recoil resulting from the rupture of a large specimen the cast iron ring which forms the abutment for the hydraulic support when the machine is used for tension is made to project beyond the hydraulic support; and this projecting ring is provided with a screw thread which engages with a corresponding screw thread on a ring resting against the opposite straining beam, which ring can be rotated by a pinion provided for the purpose. The abutment may be clamped by this ring firmly against the beam of the weighing head nearest to the straining head, so that when the specimen is broken the recoil due to the shock, instead of being

upon the wrought iron beam, is also free to slide when the rupture of the specimen takes place, until it is brought to rest by the friction of its surfaces on top of the bed.

By those precautions shock on the machine due to breakage of the specimen is entirely eliminated, and no jar of any of the parts of the machine is perceptible at the moment of rupture. The tension holders are arranged with an improved device so that the jaws which grasp the specimen hold it accurately in the axis of the machine, follow it up as it is extended during strain, and after the rupture of the specimen still hold the two parts firmly in their original position, thus doing away with all risk of injury to the operator or to any measuring apparatus which may be used to determine the extension of the specimen; at the same time the hand wheel provided on the tension holder enables the operator to readily release the specimen, no matter what strain has been applied to it.

The pump furnished with the ma-

chine up to its maximum capacity. The actual weight required on each poise rod in the scale case is thus determined, and the poise weights are carefully adjusted thereto. In ordinary operations the machine will accurately indicate, when loaded to its full capacity of 500,000 pounds, an additional weight of 4 ounces, and can be readily set to a much more sensitive point when desired. There are two auxiliary weighing platforms used exclusively for calibrating standard weights; one of these has a ratio to the main weighing platform of 100:1, the other of 1000:1, with correspondingly increased sensitiveness; it is thus practicable to standardize large weights with a degree of precision heretofore unattainable. Further particulars are: Maximum capacity, 500,000 pounds; ratio from main weighing platform to point of indicator needle in scale case, 300,000:1; ratio from second or auxiliary weighing platform to point of indicator, 30,000:1; ratio from third weighing platform to point of indicator, 300,000:-

000:1; weight of moving levers, 25,000 pounds.

Fig. 2. Capacity, 100,000 pounds. Capable of testing specimens 41 inches long in compression and 19 inches long in tension. Maximum stroke of piston, 24 inches. Maximum travel of piston, with pumps at maximum delivery, 15 inches per minute.

Fig. 3. Capacity, 200,000 pounds. Capable of testing specimens 7½ feet long in compression and 5 feet 5 inches long in tension. Maximum stroke of piston, 3½ feet. Maximum travel of piston with pumps at maximum delivery, 4½ inches per minute.

Fig. 4. Capacity, 300,000 pounds. Capable of testing specimens 18 feet long in compression and 13 feet long in tension. Maximum stroke of piston, 3½ feet. Maximum travel of piston with pumps at maximum delivery, 4½ inches per minute.

The Industries at New Castle, Pa.

The situation among the manufacturing industries at New Castle, Pa., has improved very materially within the past month. A number of blast fur-

of the Etna Iron Works, Limited, which concern have been reorganized and are now known as the Atlantic Iron & Steel Company is in operation to nearly full capacity. The Arethusa Iron Works of George W. Johnson are in operation turning out sheets as light as 30 gauge, and up to ½-inch plates. The present output of this plant is close to 40 tons per day. The works of the James P. Witherow Company, engineers and contractors, which is one of the best equipped foundry and machine plants in the country has been closed for some months. However, notices of a meeting of the stockholders of this concern have been issued, to be held in Pittsburgh, on Tuesday, February 13, at which five directors to serve for the ensuing year will be elected. At this meeting it is possible that it will be decided to open at least a portion of the works. The works of the New Castle Steel & Tin Plate Company are in full operation, turning out about 30 tons of black sheets per day, about one-half of this product being finished into tin and terne plates. Some extensive improvements are now under way by this concern, and when completed

ing with an excellent demand for their product. The plant of the Standard Wire Company, manufacturers of wire mats and other wire goods, is in full operation. This concern have recently filled large orders for their adjustable folding wire mats for Eastern shipment and their trade in these goods is constantly increasing. The firm have recently put on the market a wire jumping rope, for which they expect a large trade this season. It is made in four sizes, 5½, 6, 6½ and 7 feet long, and is already meeting with a good demand. The Vulcan Iron Company, Limited, manufacturers of castings and machine work for iron and steel works, are operating their plant to about half capacity, but are in receipt of numerous inquiries lately and expect to go on full time before long.

The Hocking Valley Coal Wages.

At a recent conference held by the Hocking Valley, Ohio, coal operators and miners the operators proposed the following scale of wages for the ensuing year: Pick mining, 50 cents per ton; track layers, 19½ cents per hour;

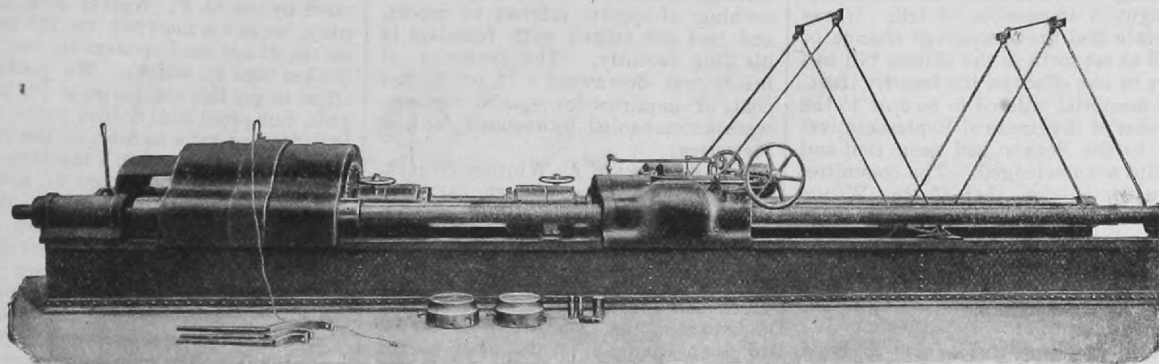


Fig. 4.

TESTING MACHINE, HORIZONTAL TYPE, 300,000 POUNDS.

naces and mills that were idle altogether have started up recently and other plants that were doing very little are now running to nearly full capacity. Starting with the blast furnaces, it can be stated that Roseana, owned by the Oliver Iron & Steel Company of Pittsburgh, is in operation and making about 250 tons per day of high grade Bessemer iron. This furnace was extensively remodeled last year, new stoves of the Massick and Crooke design were added, and it is now one of the most complete blast furnace plants in Western Pennsylvania. As yet both stacks of the Etna Iron Works, Limited, are idle, but preparations are being made to fire one stack and it will probably resume during this month. During their idleness both of these stacks have been rebuilt and new equipment added and they are now in excellent condition for a long blast. Neshannock Furnace, formerly operated by the Crawford Iron & Steel Company, but now controlled by the Shenango Valley Steel Company, is in operation, turning out about 225 tons of Bessemer iron per day, all of which is used in the Bessemer plant of the Shenango Valley Steel Company. The blast furnace of the Raney & Berger Iron Company, also controlled by the Shenango Valley Steel Company, are turning out about 200 tons of Bessemer iron per day, all of which is used by the latter concern. The plant

will materially increase their output. Experts have pronounced the plant of this concern to be one of the most modern and best equipped in the country. The Bessemer plant of the Shenango Valley Steel Company is in full operation, turning out about 600 tons of billets every 24 hours. This concern enjoy special facilities in the way of production, by which it is claimed that they can turn out steel at a less cost than Pittsburgh. Their melting stock is obtained just beside their plant and is obtained at the lowest possible cost. The rod mill of the New Castle Wire Nail Company is being driven to its utmost capacity to furnish rods for the wire nail factory. At present the output is close to 200 tons on two turns, all of which is finished into wire nails. Their wire nail factory is running night and day turning out about 3500 kegs of wire nails every 24 hours, and as the concern have a large amount of business booked they expect to keep their rod mill and nail factory on double turn for some time to come.

The works of the New Castle Street Car Company, which were destroyed by fire about two months ago, are being rebuilt on a larger scale and will be ready for occupancy within the next 90 days. The Elliot Cold Rolled Steel Company, manufacturers of strip steel for bicycles, sewing machines, &c., are in operation and the concern are meet-

drivers 16½ cents per hour; inside day labor, dumpers and trimmers, 16½ cents per hour; outside day laborers, 13½ cents per hour; trappers, 7½ cents per hour; engineers, special contract; firemen, \$1 50; pumpers, 12½ cents to 13½ cents per hour; teamsters, 13½ cents per hour; slack haulers, 11½ cents to 14½ cents per hour; room turning (pick mining), \$1.75; pick mining, nothing; entry work (pick mining), \$1 per yard; break through in entries in pick mine, entry price. Machine mining, cutting by Lechner machine in rooms, 5½ cents; cutting by same in entries, 7½ cents; cutting by Harrison machine in room, 8½ cents; cutting by same in entries, 9½ cents; break throughs between entries, entry prices; nothing extra for break throughs between rooms; loading in rooms, 25 cents; loading and drilling in rooms, 27 cents; loading in entries, 30 cents; loading and drilling in entries, 32 cents; drilling by machine, 1½ cents; loader turning a room, \$1; cutter turning a room, 50 cents; machine hauler, 16½ cents per hour.

No decision in regard to the above scale was arrived at, but another conference will probably be held at an early date.

The Elmira, N. Y., Bridge Company have the contract for the iron work of the Auditorium at Coney Island. It calls for 280 tons of iron and steel.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, on Wednesday the 7th inst., the president, Francis Schumann of the Tacony Iron & Metal Company, occupying the chair.

The Executive Committee reported that at the last meeting of that body the affairs of the association were talked over, and the opinion formed that the interest of foundrymen in the affairs of the association was growing. The meetings of the association were well attended. The existing depression in business had, the committee thought, something to do with the small number of proposals for new memberships, but a favorable change was hoped for shortly. The foundry business at the present time was in about as bad a condition as it well could be. Record breaking prices were heard of all over the country, and reports of foundries not running over three days a week on an average, with reduced forces, were a general thing. How long such a state of things would continue the committee thought it impossible to tell. It was possible that the prospect of change of tariff as set forth in the Wilson bill had more or less effect on the foundry trade. The memorial ordered to be sent to the Speaker of the House of Representatives and to the Senate had been sent and receipt acknowledged. The committee were of opinion that if the Wilson bill was ignored in the Senate, and promptly, business would again return to the condition it was in prior to July 1 last, when the foundry business was in a very flourishing condition and shops were full of work.

R. A. Register of Register & Sons, Baltimore, for the iron soil pipe section, and E. E. Brown of E. E. Brown & Co., Philadelphia, for the sash weight section of the Price Committee, had nothing to report. P. D. Wanner of the Reading Foundry Company, Reading, Pa., for the cast iron water and gas pipe section of the committee, reported that cast iron pipe was still bringing low prices, as also were special castings. For the benefit of pipe makers he would say that it appeared to him exceedingly foolish and entirely out of place that founders should cut prices on special castings. Many kept on cutting prices for no reason other than that they wanted to do so. He hoped that what he had said would be made public and that all founders following the practice of cutting would hear of it. Such people were simply throwing away the profit they might make, because, he said, there was no competition on special castings, and, where pipe was taken, orders for special castings could always be taken at better prices than were at present being asked. This concern had for the last two or three years asked 2½ cents a pound for special castings and had got this price, except where competitors had cut in, and they would have been able to get the same price if they had asked it. If the general foundrymen were to cut in on this branch of the trade, then there would be some excuse for cutting, but they could not do so without going to considerable expense. If general founders wanted to get the Philadelphia special castings, they would have to spend \$3000 to \$5000 before they could take the work. It was just so with Boston, New York and other places. And yet

those in the business all over the country would bid from 2½ cents down to 2 cents per pound. He hoped prices would stiffen up. Nobody, he thought, gained anything by cutting where it was not necessary. On pipe it seemed to be necessary, not perhaps to cut as low as some were cutting, but in order to meet competition from the South. Northern pipe men had to cut, and cut to the bone, and it seemed to him that in North or South no money would be made as long as the racket was kept up. Northern men would have to reduce their cost and consequently their wages unless they could keep the Southern founders out of their market. It seemed entirely abnormal that pipe should be sent from Alabama and Tennessee right through the States of Pennsylvania and New York to Maine. He believed that some time ago an arrangement was possible with the Southern people, but no definite agreement could be consummated and the cutting went on. The only thing to do now, it seemed, was to keep on cutting until the trade in each section would have to remain at home.

Stanley G. Flagg, Jr., of Stanley G. Flagg & Sons, Philadelphia, representing the malleable and small grey iron castings section of the committee, had nothing of special interest to report, and had not talked with founders in his line recently. The tendency of prices was downward; 75 or 80 per cent. of inquiries for special castings were accompanied by requests for better prices.

Asa Whitney of A. Whitney & Sons, Philadelphia, representing the car wheel section of the committee, had nothing to report, the condition of trade remaining unchanged.

F. A. Flather, representing the Lowell Machine Company of Lowell, Mass., members of the association, in answer to a question as to the state of the foundry business in this country, said that there seemed to be very little business in Massachusetts. His attendance at the meeting, he said, was mainly for the purpose of gaining some information in regard to molding machines, of which his company had recently felt the need. This company employed something like 1600 hands, and had several hundred in their foundry. Their work was mostly duplicate work and they were looking for something to meet that. In regard to business, they were of course subjected directly to the Wilson tariff measure. Their machinery was protected by a duty of 45 per cent. Their product was chiefly cotton mill machinery, and they did no jobbing work. The new tariff provided for a reduction of duty to 35 per cent., and where one of their machines was to-day selling for something like \$775 that price under the new tariff would have to be reduced \$100. Every cotton mill man was now saying that he could buy no machinery until the bill was passed, as he was expecting to get the benefit of this reduction. His company had no competitors on this side of the water to trouble them. On the other side similar concerns were paying just about half the wages paid on this side, and the present duty of 45 per cent. made an equitable basis of competition. If the tariff was reduced so that the foreign machinery could be sold here at \$100 less in price than the domestic, the difference would have to be met and, no doubt, would have to be met by reduced wages. There had lately been a slight demand from the South for machinery, which he could not account for in view of the existing

state of affairs in the country, but it was probable the Southerners had a little money to spend, which was not the case in the North. In shops in his line there was a little better inquiry and business was at the bottom. Any change should be toward the better instead of the worse.

Geo. S. Emerick & Co. of Philadelphia, dealers in foundry supplies were elected to membership in the association.

Secretary Evans having announced the vacancy on the Executive Committee consequent upon the resignation of L. B. Whitney, Wm. J. Sauter of G. Rebmann & Co., Philadelphia, was nominated to fill the vacancy, and was elected by acclamation.

A paper on "Molding Machines," by P. O'Connor, secretary and treasurer of the James Reynolds Mfg. Company, New Haven, Conn., was then read as follows:

Molding Machines.

Some time ago we had a communication from a Philadelphia member of your association in which he said "we were never able to make machine molding a success," and requested us to send a man to work the machine. At a foundry in this city (New Haven), operated by the G. F. Warner Mfg. Company, we saw a man put up 175 molds on one of our sand pressers in one day (spikes used in whips). We made an effort to get this man to go to Philadelphia, but could not induce him. It is one thing to get a member of the union here to do all he can on a machine, and another to get him to go to another city and demonstrate how it is done. We find that wherever machines have been introduced and the men are given to understand that the machines have come to stay there is very little trouble in effecting their successful operation.

If the superintendent and foremen are favorable to machines and have the interests of the concern in view, then there can be no trouble. But if the contrary, machine molding in whole or part, either draw plate, lift or on the common sand presser, cannot help but be a failure; for no machine ever made will do all the work properly without the assistance of the operator, all depending on the ability and willingness of such operator.

Our investigation and information leads us to believe that there is no section of the country with such a dearth of molding machines as Philadelphia and vicinity. Why such is the case we cannot answer. Why do concerns in the East and West, most of them, make everything that can be successfully made on a machine? The only reason we can give is that it must be profitable for them to do so or they would not do it. These concerns, using from 100 up to 200, and some 300 machines, do not buy them simply to help the builders of the machines. They run their concerns to make money and it is a very natural conclusion to arrive at that the use of machines and sand pressers helps them to do so. We might mention in this connection the Tuttle & Whittemore interests, Naugatuck, Bridgeport, Troy and the National Malleable Castings companies and several others.

Since our advent in the molding machine business quite recently we find that engineers in most instances want almost a guarantee of certain increased percentage before they will invest in sand pressers, forgetting the old adage of learning to creep before walking. We could not give guarantees of this

kind or send out machines on such terms and run the risk of having the operator make a failure; or in other words make it appear that the machine itself was a failure.

Another mistake very often made is putting a man to operate a machine who knows nothing about molding, the consequence being that the machine is pronounced a failure. We now speak as practical brass molders and founders of many years standing. Our opinion is that machines are an advantage on all bench work, except on such patterns as are not adapted to them, which are very few.

In conclusion we would say to such of you as are not using machines, try them. It will not cost you much. If you employ many bench molders don't begin with one sand presser. It is easier to make a failure of one than of several.

Discussion.

A discussion then followed, and the experience and impressions of members who had used or seen molding machines in operation was called for. Thos. Glover of Glover Bros., Frankford, Pa., described some machines he had seen in use in a shop in a distant part of the State of Pennsylvania. There were 15 machines, all running under power, and engaged on car work, boxes, washers and other castings pertaining to car building. He had seen a man engaged on a box such as in Philadelphia cast founders 20 cents for molding. The man was not much of a molder and had as helpers two boys and a man. When he left the shop in the afternoon they had up 154 boxes, while in Philadelphia 20 at 20 cents each was considered a big day's work. He believed the labor on the 154 boxes cost about \$4.10. Each box took a flask about 14 x 24 x 12 inches deep. The boxes were large and weighed between 30 and 40 pounds. The sand was mixed and sifted right over the machine. The machine was applicable to anything continuous. He had recently heard that the concern using the machines had increased the number in use to 24, and all their work, except, of course, repairing, was made by the machines.

Stanley G. Flagg, Jr., said he saw a machine in operation in Altoona, and made a note of his observations. He said a man was making pedestals such as go on freight cars. The machine riddles the sand and draws the pattern. One man draws machine and sets the cope on the drag, while another sets the core and wets the mold. The pedestal was made in a flask 15 x 24, 14 inches deep; that is, the cope 7 inches and the drag 7 inches. The two men made the plate in 8½ minutes. One man put the drag on and filled it with sand. He was told they were paid 10 cents for each flask, and the company pay for the riddling. The machine was run on the principle that two men do so much work and three men so much more. For the two men mentioned the day's work was 52 flasks, and three men had completed 80 to 100. E. E. Brown of E. E. Brown & Co., Philadelphia, stated that about two years ago he was in the shop he thought Mr. Glover had mentioned, and there saw 24 machines—he believed this was the number—and they were then simply in use for ramming the flask; they had abandoned drawing the pattern with the machine and simply used it to ram the flask. The flask was then placed on the floor and a molder drew the pattern.

T. B. Harkins of Bristol, Pa., stated

that he had a machine in use on sash weights and dumb bells. Some years ago he made some 50,000 railroad chairs on molding machines made specially for the work, but the chairs turned out to be failures.

R. A. Register gave his experience with molding machines. He said he hoped none present would ever have to go through what he did. The experience had cost him between \$50,000 and \$75,000. Four machines were at the present time lying out at his works exposed to sun and rain, gradually wasting away. By the time good times came back they would probably be under the rocks. His experiment was, of course, on a larger scale than any one would again attempt. It was the making of a flask 72 x 48. The machine made a most beautiful mold, but it was not practical. When the draw plates were under pressure, first a cap would spring; new caps would be made and fitted, then the body of the machine would spring; a new body would be made, then trouble would occur with the draw plate, followed by trouble with the cap again. And so things went on, one after the other. The pipe they were making was only ¼ inch thick. His last business before leaving home to attend this meeting was to forward papers for a \$50,000 suit against the manufacturers of the machines. He had two machines for making cast iron soil pipe, one machine for soil pipe fittings and another for making sinks.

Mr. Bancroft of Wm. Sellers & Co. Philadelphia stated that his concern had two molding machines at their works and they were found to work very well. They had been in use about ten years. They made about 120 flasks per day, the flasks being about 20 x 14 x 4 inches deep. They had one man on one machine and two men on the other which was a larger machine. The work was hangers and shafting boxes. He was satisfied that molding machines were good things to use.

President Schumann was of opinion that the character of the work seemed to have a good deal to do with the success of a machine.

Mr. Flagg said he had seen some pretty correct work made on molding machines, notably bodies of valves, &c. Secretary Evans then announced the reading of the following paper by W. J. Keep, superintendent of the Michigan Stove Company, Detroit, Mich., on "Foundry Chemistry." Mr. Keep was unable to be present, so the reading of the paper devolved upon Mr. Flagg.

Foundry Chemistry.

The substance of a paper by E. A. Wheeler and the discussion before the Western Foundrymen's Association is substantially as follows: The constant change going on in a blast furnace will cause a variation of silicon in one day of at least one-half of 1 per cent. By adding silicon, as good castings can be made with gray forge pig as with other grades. Too little silicon makes hard iron, and *vice versa*. One-fourth of 1 per cent. burns out in remelting. During the discussion, one member having had trouble imagined 1 to 1½ per cent. of sulphur found in his coke had caused the trouble. Another thought selling by analysis a failure and preferred fracture. He thought there was a great variation in silicon in each furnace cast. Another, who was a chemist, said that a cupola was not hot enough to increase silicon. He thought it desirable to purchase iron and grade by silicon. He said that any chilling influence in the

furnace or pig bed would lower the grade, but that sulphur by itself would not lower the grade. He thought most furnaces analyzed each cast. He thought the way most foundrymen have used analyses made them worse than useless. To correctly sample a car of pig iron take five to ten samples if uniform, but if not take 20 or more. Before commenting on the portion of these remarks that we consider in error, we will quote from the November *Foundry* what we will call

Keep's Foundry Chemistry.

The best iron for castings is exactly what the market affords at the lowest prices. Any marketable iron can be used if properly mixed with other marketable irons. The fuel used in the cupola, if of ordinary good quality, will not impart enough sulphur to the iron to in any way affect it. If the fuel does not give as good iron as expected, it is probably due to a large amount of ash; that is, it has not as much carbon as it should contain. The fuel will do its work in proportion as it contains little or much ash. It is not possible to keep track of such variations and we blow the cupola as hard for poor as for good fuel.

Manganese in the quantity found in ordinary merchantable pig iron exerts no deleterious influence. It does not make iron white, or cause carbon to take the combined form, and it does not increase a tendency to chill. It slightly hardens the casting and increases the shrinkage, and the iron is a little more difficult to melt. If in the casting it was 1½ or 2 per cent. these influences might be felt, but such an amount cannot be obtained by using ordinary cheap pig iron.

Phosphorus does no harm unless it reaches more than 1 per cent. in the casting, and then it only weakens the iron, but this amount can hardly be obtained from ordinary pig iron. It does not make iron white or increase the chill. It decreases shrinkage and causes the iron to remain fluid longer and lessens blow holes. It, however, is not to be sought after.

Sulphur in ordinary gray pig iron can never exceed one-tenth of 1 per cent., and rarely exceeds five one-hundredths. This amount does not exert any perceptible influence.

Carbon in pig iron will vary in total amount, but we will not pay any more for a pig iron if it is high in carbon, though it would melt a little easier and would make a darker casting. Practically the grayness of pig iron or of a casting is dependent upon the percentage of silicon present. If it contains enough silicon to make it gray its combined carbon will be low.

Silicon is the only thing necessary to the founder, as all other things in cast iron can be overlooked. If the shrinkage is not low enough, if the iron is too hard, or if it is not gray enough, add silicon. It remedies all other defects. It is the only variable to consider, and it is the easiest to manage. It is not necessary to use high priced silicon iron, as any iron containing from 4 to 6 per cent. of silicon, with phosphorus not over 1 per cent., is better.

If a chemist understands this practical view of the case he will never say that a casting contains too much combined carbon, and that you must look out for the evil effects of phosphorus, sulphur and manganese, but he will say, your iron is too low in silicon, and you must use more silicon iron.

This is all that any founder needs, and is all that most can practically use.

Without a chemical education, or with one if he has not adopted the above modern ideas, any one will be as much at sea as the above member who imagined trouble on account of 1 per cent. sulphur in his coke.

It will do little good for the ordinary founder to employ a chemist at his works. For economic reasons he ought to use all the scrap he can, and he can get no satisfactory analysis of this, and pig iron will not run uniform. Any forehanded founder will purchase large quantities of pig iron when the market is low, and will not have room to keep a record of where each car is piled, even if it were desirable to do so.

An analysis of a casting will give the exact average of silicon in the mixture, scrap and all, but this is not what is wanted, for silicon as it exists in one kind of pig iron will be much more effective than that in another brand. By using one brand 2 per cent. will do more than $2\frac{1}{2}$ per cent. from another brand.

The mechanical structure resulting from certain combinations of pig iron will give remarkable results without reference to chemical constitution. Hardness and chill, and strength to some extent, follow shrinkage. To make castings with great strength and low shrinkage you might in some cases mix irons with low strength and high shrinkage, and therefore it is best for the founder not even to worry about such a record of pig iron.

What he needs is to make a physical test of his castings to determine the relative shrinkage and transverse strength. If these castings are satisfactory then use this record as a standard and vary the mixture to keep to the standard. Never mind the chemical constitution if the result is satisfactory. Hardly any two castings are of the same size, therefore such a test is purely relative; that is, we say a test bar with a shrinkage of 0.155 will make a satisfactory engine bed plate; a shrinkage of 0.130 will give satisfactory castings for stoves and light hardware; 0.225 for solid white castings for malleable iron, and we soon find how much smaller or larger castings we can make from iron of this shrinkage. We wish to state that, all things considered, a $\frac{3}{4}$ -inch square test bar 1 foot long, is the best for relative results.

Chemical analysis is too slow and too expensive for a foundry making casts every day, and no two chemists agree as to what is needed, because this cannot be decided alone by analysis. Chemists often say what is perfectly true, that neither foundrymen nor furnacemen know what chemical constitution is required to make the best castings, but the reason is that other things as important enter into the problem.

Perhaps the founder who makes light castings and uses no scrap would be most likely to be benefited by a chemist. Perhaps the writer would be likely to know how to use analyses, but if they were offered free of cost we could not use them to advantage, except in scientific research.

Why does Mr. Wheeler and why do nearly all chemists say that all furnaces are willing to analyze each cast and furnish iron with a given percentage of silicon? We are willing to concede, if they say it is so, that furnaces making Bessemer pig do this. Such chemists are familiar with steel works but not with foundry routine. The ores that such furnaces use prevent their entering the foundry market. If we are correctly informed these very furnaces

have to ask a leeway of 1 per cent. of silicon on all contracts. Why is this so, if they are willing to sell to founders guaranteeing an exact percentage of silicon and advise watching the one quarter of 1 per cent. that burns away? We will venture the assertion that no furnace running wholly on foundry iron analyzes its pig iron, and very few employ a chemist, and then only to look after their raw material. This is exactly as it should be.

Discussion.

Charles F. McKenna of New York, being asked for his opinion on the paper, said: "I have nothing to say. After the long experience of Mr. Keep. I can only say that if Mr. Keep had constantly used the results of chemical tests in conjunction with his many physical tests he would have placed himself in possession of a great deal more information. I am not ready or prepared to take exception to any of his particular statements.

Mr. Flagg: Some time ago a personal friend of mine called to see Mr. Keep and told me that Mr. Keep expressed himself very decidedly against chemical analyses as applied to practical foundry purposes. Mr. Keep has only recently, I believe, published an article on the effect of sulphur. Some people believe that sulphur in a cope has quite an effect on the castings, and Mr. Keep attempted to disprove that belief. Mr. Keep said that if he had any trouble with his iron he would make a few test bars, and in a day or two would get the trouble straightened out and know where he stood.

President Schumann: It carries out the theory that silicon plays a more important part in iron than we realize.

Mr. Flagg: I used to be very much in favor of chemical analyses in foundry practice, but have changed my mind a great deal in the last two years. It seems to me one should have a knowledge of chemistry without doubt, but there is lots of room for experience in the way of determining the value of material purchased, looking after the waste, and so forth.

Mr. Devlin: We have so recently in our works employed a chemist that we have not an idea as to the benefits derived. We do not propose to take a step backward. I am surprised at Mr. Flagg taking the position he does, as it is so recently he favored the idea of employing a chemist for the association, but he has probably changed his mind. We think we are gaining sufficient from chemistry to continue the use of a chemist. We analyze every car of pig iron that comes in and all the raw material. We have found in coke over 1 per cent. of sulphur, and we did find bad results from it in our castings. We found in pig iron we ordered to contain no less than 1 per cent. of silicon, when received less than six-tenths of 1 per cent. We use chemistry both in buying iron and in mixing it. The chemist gives the cupola man a prescription, so to speak, and he works from that as long as the particular iron referred to is in use.

Mr. Flagg: I should like to defend myself. Mr. Devlin has said that I favored the idea of employing a chemist for the association. As I recollect it I made a motion that the association consider the question, but I am not aware of the fact that I pressed the matter. I spoke against it on several occasions.

A. Outerbridge: I have had some connection with analyses of iron for the last 13 or 14 years. In 1881 I investigated the subject, with a view to de-

termining the causes of variation in the chilling of iron in car wheels. I think we were indebted to Dr. Dudley for the first wedge in this country, and it was the result of an investigation into his methods in 1880 that led me to undertake my investigation into the chemical composition of iron, especially for car wheels. Now I am not prepared to say much this evening, but it may be interesting to you to know that in that particular branch the chemical analysis of iron has been worked up probably as accurately as the manufacture of steam. It is the only branch of foundry practice of the present day that has been so perfectly investigated. The practical effect of silicon in car wheel iron is to cause a decrease of chill, and the amount of variation that is possible—not even that is practicable, but is possible—in a car wheel is very much smaller than any one would suppose until he has actually proved it by a great many tests made sufficiently often to evolve a law. I think I made the statement in print, in 1881, that a variation of one half of 1 per cent. in silicon would make or mar an entire day's work in the car wheel business. It seems a remarkable statement (but it has been going on for 50 years) that limit of tolerance, as the chemist calls it, has been controlling the car wheel business since its inauguration. In those days the tests were physical tests, and in so far I agree with Mr. Keep that if the physical tests are of the proper kind they give good results. The physical tests used to be simply a chill test for each carload of iron bought for the first car wheel establishment started in the City of Philadelphia. Every carload was subjected to a special physical test called a chill test, and the record of that car was kept and the mixture made up on the basis of that chill test. That test was a standard piece of iron of definite size cast in sand. The piece was then broken; the iron was melted in a special cupola; perhaps 2000 pounds of iron formed the test, and a number of pigs were used. It was then piled away. The next car came in, and it might be from the same furnace, but the test was applied. Iron is uniform. The element of iron is always the same thing, no matter what ore you take, no matter how much phosphorus in it. You can make pure iron out of the very worst material. Now, an alloy for foundries consists of 95 per cent. roughly, certainly 90 per cent., of pure iron, no matter where it comes from, and 10 per cent. of substances that go to alloy that. In the car wheel business there is one element that controls the chill, and that is silicon. And if a man's mixture of car wheel iron varies more than 1 per cent. he ruins his car wheel. The average composition of the car wheel is, we will say, 0.65 per cent. of silicon. If the composition contains less than 0.5 silicon, a mixture is obtained which will produce a magnificent hard tread upon the wheel, but it will also produce a mottled plate when it ought to be grey. What is the result? The moment the brakes are put on the wheel it cracks with the contraction. Sometimes it is necessary to put a dipping piece on the edge of the wheel, because the variation has been less than one-half of 1 per cent. That is invariably the case with all irons with which I have any familiarity. I am recalling now a past era. My subsequent experience has been in another direction. I did not expect to speak upon the subject, and I do not feel at liberty at this time to say anything further.

Asa Whitney: As an average we do not now allow a variation of over two-tenths of 1 per cent. in the silicon—that is, in heavy wheels. Mr. Keep speaks about chemistry as being expensive and slow. We make up mixtures every day for an analysis of each carload. All the elements must be watched carefully in the same manner as the silicon is watched. We calculate every mixture made, upon a chemical basis, and we test the mixture physically every day. We experience great benefit in availing ourselves of a chemist's services both in compounding irons and buying others to match them.

W. C. Henderson (chemist to Thos. Devlin & Co.): Mr. Keep touches upon the time and cost of chemical analyses. A silicon determination recently took 9½ minutes from the time of crushing sample, making silicon determination and tabulating results. I have frequently made manganese determinations by one of the long methods in 17 minutes, for the whole operation, with a result which any chemist on a witness stand would be prepared to vouch for as to its accuracy. The color method for combined carbon, and also for manganese can be applied in 20 minutes. The phosphorus can be determined very accurately in 2 hours, and approximately for all ordinary purposes in half an hour. Touching the cost, in the little laboratory which I now have, during the last two years the cost for each determination has averaged 20 cents for wear and tear of laboratory and all chemicals used. This does not however include salary. This was the average cost for taking all determinations. A great thing in the employment of a chemist is the protection afforded by chemistry to manufacturers; in guarding the manufacturer against imposition. It is impossible for him, with a chemist's services, to load himself down with inferior materials, because he is enabled to buy his material by certain chemical standards, and he is not obliged to accept it unless it conforms to the standards. That protection certainly means something to the good in the manufacturers' pocket.

President Schumann: In one thing the chemists seem to have failed to satisfy the foundryman. I have never seen a paper published giving the ideal elements constituting iron for certain purposes. We foundrymen, therefore, do not know what elements to have. For this reason, perhaps, Mr. Keep is antagonistic to this branch of tests.

Mr. Henderson: You would hardly expect a physician to give you a prescription to answer every time you had a headache. The question arising would be, What caused the headache? The reason specification of certain elements for certain purposes has not been made is that conditions are not always the same. For instance, you could not expect the chemist to give you, if working on scientific accuracy, the exact amount of coke required to melt an exact number of pounds of iron, because some irons melt at a lower temperature than others; consequently the lower the irons in impurities the more coke required to melt and *vice versa*. There could be no set rule. Then, as fuel, coke is largely used. The percentage of ash varies considerably, running all the way from 8 to 20 per cent. That cuts a tremendous figure. These conditions have all to be understood by the chemist, just as the physician has to know what causes the headache. If a chemist could dictate certain rules to cover all cases there

would be no need of chemists other than the first one.

President Schumann: But foundrymen have not the least idea as to what an ideal might be. Say here is an iron that contains such and such elements. What is the result in the casting? We do not know that much.

Mr. Henderson: Any chemist or metallurgist, upon learning the kind of work it was desired to make, could give an analysis of the necessary mixture. All that would then be necessary would be to mix the irons to get that percentage when in the cupola, and it could be got every time. But before it could be done a complete analysis of all the materials used in production must be obtained.

President Schumann: This might be a foundryman's position. He says to a chemist, "I have here a casting that requires a minimum of shrinkage. It must have certain tension, a certain hardness; the iron must be fluid, because it runs into subdivisions. Now what mixture shall I make?" Is it possible for a chemist to tell him what constituents to seek in his irons?

Mr. Henderson: Yes. It is done every day. For instance, steel rails are sold on the closest kind of specification, requiring absolute results from the testing machine. The railroad companies have certain inspectors to look after these tests. With a study of physical and chemical conditions a foundryman should be able to decide upon elements himself, but it was customary to employ a man who made it a special study.

Mr. Outerbridge: I may add a word to what I said. One of the objections Mr. Keep raised was that the variations in the carloads of iron were so large that while an analysis might be furnished to the manufacturer of one particular pig of iron, or a lot, he had no guarantee that that uniform average was maintained throughout the car, or certainly in the next car, which was supposed to be the same. Now the answer to that objection is that the modern practice in carefully conducted foundries is not to depend upon one, two or three irons, or a melt, but to make a melt of a considerable number of irons which have been previously analyzed. Now, as soon as you begin to increase the number of irons forming your melt you begin to decrease the possibility of variation. If you have 1 per cent. of an element in a certain carload of iron, and it would be vital to your casting to have 1 per cent. of that element in your product, you would be very foolish to use the whole of that lot of iron. But if you reduce it one-half you consequently reduce the percentage of element of that half. In car wheel works I used, as an average, about 15 lots. Now, to show you how you may rely upon the practice I can recall an experiment made in 1882 with great accuracy. On a certain day a sample was taken from every lot of iron which was to go into the product on that day. The analysis, especially for silicon, was made of each one of these irons. Now of some of the irons 15 per cent. was used, of others 5 per cent., of others 10 per cent., others 20 per cent., and so on, making up a charge of 2000 pounds, as customary. Now we analyzed each lot of these irons and then calculated the theoretical percentage of silicon which should appear in that product. Knowing the percentage of silicon in each iron we determined the theoretical percentage contributed by all these materials, and if my recollection is correct the total

silicon contributed by the whole of them was seven-tenths of 1 per cent. The actual analysis of the car wheel was about six-tenths of 1 per cent. The actual product of the car wheel on that mixture came within one-tenth of 1 per cent. of the theoretical percentage. That shows, again, what was done in 1882.

The meeting then adjourned.

American Machinery and Tools in England.

(By a London Correspondent.)

One of the most remarkable features of industry in the United Kingdom at the present time is the comparatively large imports of American machinery and machine tools—particularly the latter—which have been received in England during the 11 months ended November 30, 1893, the value of agricultural implements having been \$547,341; builders' hardware and saws and tools, \$589,005. and steam engines and other machinery, \$1,867,073.

These imports are particularly significant to practical business men in England, and the continued introduction of American machinery into the United Kingdom gives rise to several considerations. One of these questions is: How is it that American manufacturers can send these goods to England when higher wages are paid in the United States and where raw material is sometimes said to be dearer than in England? and secondly, How is it that, as this import trade has been going on for several years—steadily growing all the time—how is it that English makers and engineers do not set to and supply their home market themselves instead of importing American made tools? also, that England has claimed the position of being the first of all engineering manufacturing nations, first in manufacturing ability and constructive mechanical skill?

These two questions can be dealt with together, and, as it may be interesting to American readers, I propose letting a little light in on the matter. The first and primary reason why American tools are imported into England is because they are far superior to British made tools. "Accuracy, accuracy, accuracy," are the ends which American manufacturers have set before them. All practical engineers know that good and accurate work can only be done with perfect tools, and in so far as they are imperfect, just so far will the product be imperfect. A little time ago a merchant went into a big London engineering store and asked the chief if he could supply him with a certain machine tool, the accuracy of which he could absolutely guarantee. "Oh, yes," said the chief, "we can do that. Here is the identical thing." The smile of satisfaction died out of the merchant's face when he saw it was American, and because it was American he declined to take it, the old antipathy against the States being much "in evidence." He was not going to have any foreign goods, not he! Couldn't the chief show him an English machine and guarantee it? "Plenty of machines," said the chief, "but no guarantees." He went away fuming, trotted all round the trade, and came back again to the original store. His efforts had been unsuccessful; the old fossil was still unconvinced, but grudgingly decided to take an American tool and read the guarantee with a Jew's eye. "It was just a trial," he said, to soothe his national vanity.

Now, that man was going to pay several hundred dollars for his tool, and he wanted something that he could depend upon. He would much rather have given the order for an English made tool, but it was because of the unreliability of such goods that the English makers lost the sale. That is only one example of what is happening every day all over the world. There are several good firms in London importing American machinery and wherever they get their foot they ultimately succeed in planting a whole set of American machinery. There is also a fine catalogue published by one of these firms, consisting of over 300 pages freely illustrated and wholly devoted to American tools and machinery.

Take another illustration. Go into an English store (shops, as they are called) and ask for a tool for doing a certain part of an engineer's job. The answer will frequently be: "Oh, we haven't got a bit just for that particular job, but we dare say you can make it

may be the port) six days after receipt of cable, and is landed, on an average, on the tenth day, making a total of 16 days. In some cases it may be less, but I am taking the least favorable view of the American side.

Finally, I would say that the old scornful feeling against American mechanical skill is dying out here, in face of the indisputable fact of American superiority in many branches. American machine tools are coming more and more into fashion in England, as their sterling value is appreciated. This must necessarily be so, as competition compels makers to use the very best appliances at hand. English engineering firms have tried many times to compete with their American opponents in the trade, but their efforts have up to the present always resulted in failure. This in itself is a tribute to American superiority, as imitation is the sincerest form of flattery. English makers make no concealment of having copied United States designs and it is a great pity

Calculation of Fuel Charges for the Iron Blast Furnace.—I.

A. P. BJERREGAARD, NEW YORK.

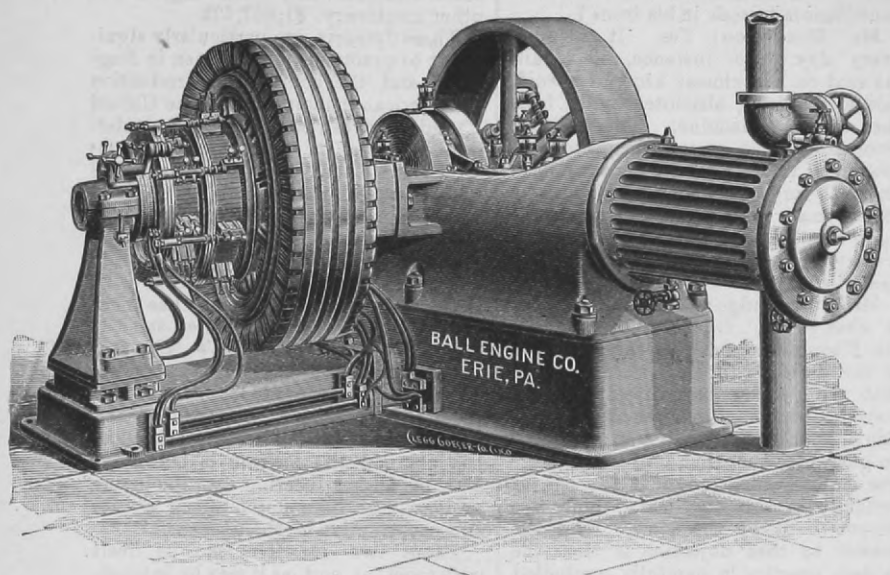
Part I.—Introduction.

The proper amount of fuel to charge with a given ore mixture, together with its flux, or, as the furnaceman would say, the proper burdening of the furnace, is a subject of the greatest importance to the metallurgist. It is one to which much attention has been given, and yet upon which very little has been written. Many volumes have been published relating to the structure of the furnace, the chemical and physical properties of pig iron, the methods of analysis of furnace materials, &c., but almost nothing has been said about the proper amount of fuel to use. Many methods, some of them of great excellence, have been published showing how to calculate the proper amount of flux to use with a given ore, but the method for calculating the amount of fuel is still upon an empirical basis, and a poor one at that. It is a common practice for furnacemen to burden the furnace according to some rule of thumb method, and then, if the furnace works well, gradually to decrease the amount of fuel, or, what is the same thing, increase the burden. Inversely, if the furnace works badly the fuel is increased. (N. B.—In using the term "working badly," I have no reference to that form caused by scaffolds, &c. In such cases the mere addition of more fuel will not improve the condition of the furnace unless the increased heat melts off the obstruction.)

Such practice as that described above is certainly wasteful and costly, and in these days of close competition some better method is needed. Not only is much fuel wasted or much iron spoiled, but the life of the furnace lining is undoubtedly shortened by such methods. It is not claimed that the whole of the method about to be described is entirely original. Nothing is strictly original. Everything is an adaptation, modification or combination of something previously known. A tabular form similar to that here used was employed by Sir I. Lowthian Bell to exhibit the results of actual practice. But he devised no simple method for finding the number of pounds or tons of fuel to charge into the furnace. It is hoped that some one will some day devise a shorter and simpler method than that here presented. At present such a method is a desideratum.

If the reactions and factors, as shown in the tables of this paper, are scratched on a properly ruled slate, the pounds and the resulting calories may then be written in with a slate pencil each time a calculation is made, and then, when summed up and the calculation is finished, the variable figures may be rubbed out leaving the slate ready for the next time. In such a manner the amount of writing and figuring is reduced to a minimum.

Tables of the heats of decomposition, specific heats, latent heats and total heats of many substances commonly met with in blast furnace practice are inserted in order that all the material may be at hand for the calculation when using any particular ores, &c. These data are found scattered in many volumes, most of which would probably be inaccessible to the majority of furnace chemists or superintendents. No attempt has been made to quote authorities in these tables: 1, because many



THE BALL DIRECT CONNECTED ENGINE.

do with so and so." That answer lets in a flood of light on the subject. It is because so many English artisans make shift with dubbing tools and make one appliance answer for a dozen jobs that their product is often so poor. That, too, illustrates the difference between the two types of artisans. The American operative will invent a tool to do the job quickly and well.

The American system of production lends itself admirably to the manufacture of first-class tools at reasonable rates. Producing in large quantities, using labor saving appliances, magnificent plant, specially adapted for making specific tools—all combine to enable the American manufacturer to place really superior tools on the British and other foreign markets at prices which compare favorably (when the superiority of the goods is considered) with those made by British manufacturers. The English makers turn out only a few lines to order; they too often wait until an order is sent them before making the goods. Consequently, in many lines, delivery of goods is delayed. In the case of the American tools, a merchant can order in London or any other city any given tool for which there is anything of a demand; the order is cabled to the American maker and the machine leaves New York (or whatever

that something cannot be done to prevent such discreditable proceedings.

The Ball Direct Connected Engine.

The present method of directly connecting the engine to the dynamo has a two fold advantage. The first is the small floor space occupied, which is an important consideration in central stations and large buildings. Another advantage is in the elimination of wastes of energy by transmission through belts and countershafting. With the direct connected engine the frictional losses due to outside causes entirely disappear, leaving nothing but the internal friction of the engine to be accounted for. The accompanying engraving represents an 80 horse-power engine, built by the Ball Engine Company of Erie, Pa., directly connected to a Waddell-Entz dynamo. It shows the armature mounted on the engine crank shaft, which is supported on the end by an outboard bearing resting on an extended sub base. This is a remarkably compact, durable and efficient arrangement and has given the greatest satisfaction in practice.

The engine is of the standard type, built by the Ball Company.

of the data were collected several years ago for my own use, without noting authorities and without any idea of publishing them; 2, because few chemists or furnacemen would have either time or opportunity to verify them.

temperature. Such increments for temperature as have been determined are inserted and use made of them in our calculations. In so far as these increments are wanting our method is imperfect. By temperature, above, is

Heats of Decomposition of Substances met with in Blast Furnace Practice.

Reaction.	Calories.	Per unit of	Calories.
[H ₂ + O] to vapor.....	57,560	H ₂ O.....	3,198
[Fe ₂ + O ₂].....	192,000	H.....	28,780
[Fe ₂ O ₃ + y H ₂ O].....	950	O.....	3,598
[Fe ₂ + O ₂ + y H ₂ O].....	191,150	Fe ₂ O ₃	1,200
[Fe ₂ + O ₂].....	261,000	Fe.....	1,714
[Fe + O].....	69,000	Fe ₂ (HO) ₂ O ₆	4.5
[FeO + Fe ₂ O ₃].....	8,800	Fe.....	8.5
[FeO + SiO ₂].....	310	Fe ₂ O ₃	6
[Fe + S].....	25,000	Fe.....	1,710
[Mn + O ₂ + H ₂ O].....	116,330	Fe ₂ (HO) ₂ O ₆	910
[Mn + O].....	94,800	Fe ₂ O ₃	1,125
[Si + O ₂].....	219,240	Fe.....	1,554
[P ₂ + O ₂].....	400,120	FeO.....	958
[Ca + O].....	130,930	Fe ₂ O ₄	38
[CaO + CO ₂].....	42,500	Fe.....	52
[CaO + H ₂ O].....	15,540	FeO.....	4
[CaO + SO ₂].....	85,450	Fe.....	446
[CaO + SO ₂ + O].....	117,610	S.....	781
[Ca + S].....	92,000	MnO ₂	1,337
[MgO + CO ₂].....	18,000	Mn.....	2,115
[BaO + SO ₂].....	102,000	MnO.....	1,335
[BaO + SO ₂ + O].....	136,110	Mn.....	1,724
[Al ₂ + O ₃].....	405,000	SiO ₂	3,410
[Al ₂ O ₃ + 3H ₂ O].....	16,080	Si.....	7,330
[S + O ₂].....	103,240	P ₂ O ₅	2,818
[S + O ₂].....	71,680	P.....	6,453
[SO ₂ + H ₂ O].....	21,320	CaO.....	2,338
[SO ₂ + O].....	32,160	CaCO ₃	425
[C + O ₂].....	96,960	CaO.....	759
[CO + O].....	68,370	CaO.....	277
[C + O].....	29,000	CaSO ₄	629
$\frac{7}{10}$ [C + O] + $\frac{3}{10}$ [C + O ₂].....	50,390	CaSO.....	865
[CH ₄ + O ₂].....	213,530	S.....	2,875
[CO ₂ + C].....	-39,370	MgCO ₃	214
		MgO.....	450
		BaSO ₄	438
		BaO.....	667
		BaSO ₄	584
		BaO.....	890
		Al.....	7,500
		Al ₂ O ₃	3,970
		Al ₂ O ₃	158
		SO ₂	1,290
		S.....	3,228
		S.....	2,220
		H ₂ SO ₄	217
		SO ₂	502
		CO ₂	2,204
		C.....	8,080
		CO.....	2,442
		C.....	5,897
		CO.....	1,035
		C.....	2,418
		C.....	4,115
		CH ₄	13,348
		CO ₂	-768

In the preceding table the first column gives the reaction that takes place; the second the number of calories for the equivalents expressed by the formula for the reaction; the third gives the symbol of the substance for each unit of which the number of calories stated in the fourth column are absorbed or produced. If the reaction expresses an act of combination, the calories represent the amount of heat given off; if the reaction is a decomposition the same amount of heat is absorbed. The only exception to this rule is the reaction [CO₂ + C], in which the heat is absorbed when the combination takes place.

It may be well here to define what is meant by the term calorie. It is that quantity of heat necessary to raise the temperature of 1 gramme of distilled water from zero to 1° C. Hence, a quantity of 10 calories will raise 10 pounds of water from 0° C. to 1° C., or (approximately) 1 pound of water from 0° to 10° C.

In the following table of specific heats, the first column gives the name of the substance and the second its specific heat. It is a physical law that the specific heats of true gases do not increase with the temperature. Solids, liquids and vapors, on the contrary, require a larger amount of heat to raise their temperature 1° the higher the temperature is. This additional amount of heat may for convenience be called the increment of specific heat for

meant the difference between the initial temperature of the substance when put into the furnace and its temperature when taken out. In the following calculations we assume the initial temperature of the materials to be 40° C., and the temperature of the iron and slag when leaving the furnace to be 1500° C. (N. B.—We do not mean to say that 1500° C. is the highest temperature attained. But such local places in the furnace as may get higher will give up the extra heat to surrounding bodies, thus heating them). Hence, a substance must be raised through a temperature of 1460° C. The blast is supposed to be heated to 550° C., while the escaping gases are assumed to be at 325° C., a temperature very near the truth.

For those substances which have no increment, or whose increment is not known, we simply multiply together the mean specific heat, the temperature (as defined above), and the number of pounds of the substance under investigation, and the product is approximately the number of calories required.

For those whose increment is given we use the following algebraic formula:

$$c = \frac{t}{2} [2a + (t - 1) d]$$

which is simply the formula for an arithmetic series, in which

a = specific heat at 0° C.,

t = rise in temperature,

d = increment per 1° C.,

c = the number of calories required to heat one unit to the required temperature.

The specific heat of blast furnace gases was found by means of the well known physical law: The specific heat of a mixture is the average of that of its component parts. The composition of the gases was taken as:

CO ₂	11.6
CO.....	25.2
N.....	60.7
H.....	2.5

If bituminous coal is used instead of coke or anthracite, the composition of the gases will be different.

Specific Heats of Substances met with in Blast Furnace Practice.

Substance.	Specific heat.
Water.....	1
Water vapor.....	0.420
Water, ice.....	0.5040
Iron, cast.....	0.1058
Iron, cast.....	0.1208
Iron, foundry pig.....	0.0905
Iron, white pig.....	0.0894
Iron, pure.....	0.108928
Slag.....	0.1479
Coke.....	0.1571
Anthracite.....	0.2700
Charcoal.....	0.2415
Marble.....	0.2140
Calcspar.....	0.2046
Dolomite.....	0.2161
Lime.....	0.2710
Magnesia.....	0.2440
Magnesia carbonate.....	0.2270
Gypsum.....	0.2728
Anhydrite.....	0.1854
Heavy spar.....	0.1088
Hematite.....	0.1680
Magnetite.....	0.1667
Clay iron stone.....	0.1894
Iron carbonate.....	0.1934
Limonite.....	?
Manganous oxide.....	0.1570
Manganese dioxide.....	0.1590
Manganese hydrate.....	1.176
(Mn ₂ O ₃ H ₂ O).....	0.1357
Ferrous sulphide.....	0.1300
Pyrite, common.....	0.1600
Pyrite, magnetic.....	0.1310
Pyrite, copper.....	0.1853
Quartz.....	0.1945
River sand.....	0.2836
Clay, raw, impure.....	0.1850
Clay, burnt.....	0.1770
Glass.....	0.1958
Hornblende.....	0.1938
Augite.....	0.2170
Alumina.....	0.1780
Lime silicate.....	0.1910
Dioptase.....	0.1890
Olivine.....	0.1910
Orthoclase.....	0.1960
Albite.....	0.2082
Fluorspar.....	0.2018
Graphite (natural).....	0.1961
Graphite (furnace).....	0.2371
Air.....	0.2477
Nitrogen.....	0.2182
Oxygen.....	0.188
Carbonic acid.....	0.2474
Carbonic oxide.....	0.5929
Marsh gas.....	0.4040
Olefiant gas.....	0.3490
Hydrogen.....	0.2277
Blast furnace gases.....	0.2200
Dust in ditto.....	0.2200

Latent Heats of Substances met with in Blast Furnace Practice.

	Calories.
Melting ice.....	80
Boiling water.....	607
Melting foundry iron.....	46

Melting Points of Substances met with in Blast Furnace Practice.

	Degrees Centigrade.
Foundry pig iron.....	1,450
White pig iron.....	1,175
Slag.....	1,445
Average temperature of materials leaving the furnace.....	1,500
Pure iron.....	1,700

Total Heats of Fusion of some Slags.

	Calories.
Black iron slag.....	336
Sesquisilicate of Ca and Mg.....	440
Bisilicate slag.....	450
Singulosilicate with gray iron.....	492
Singulosilicate with forge iron.....	433
Bisilicate charcoal slag.....	380

To save space, tables of specific gravity and of atomic and molecular weights are omitted, since most chemists and furnacemen will have them at hand.

Part II.—The Method.

The method under discussion is based upon the supposition that when the furnace is working properly there is

necessarily an equilibrium between the heat generated and that absorbed. This is self evident, for if more heat were absorbed than generated the furnace would cool, or "chill," as it is technically termed. If, on the other hand, more heat is generated than absorbed there will either be a waste, or the heat will act on the brick lining or some other part of the furnace.

In order to find how much heat a given ore mixture will require we must analyze it and apply the physical factors that have been determined for each constituent. These factors are given in Part I of this paper. All ores are essentially mixtures, and the physical laws relating to mixtures apply to them. Likewise the physical and chemical laws that apply to the separate constituents of the ore, when they are in a pure state, apply without appreciable change to them when in admixture with other substances, unless there are definite laws relative to mixtures that contradict them. This method considers all these laws. It can best be described by the use of an example.

Part III.—Example I.

Let us suppose that we have an ore mixture of the following composition :

Fe ₂ O ₃	67.14
Al ₂ O ₃	3.90
CaO.....	0.50
MgO.....	0.10
SiO ₂	15.70
P ₂ O ₅	0.46
MnO.....	0.26
Combined H ₂ O.....	11.33
Moisture.....	0.61

Total.....100.00

One hundred pounds of such an ore will yield 50 6 pounds of pig iron, as follows:

Fe.....	47.0
Si.....	1.3
P.....	0.2
Mn.....	0.1
C.....	2.0

Total.....50.6

It will produce 18 pounds of slag, whose constituents will be:

Al ₂ O ₃	3.9
MnO.....	0.1
CaO.....	0.5
MgO.....	0.1
SiO ₂	13.4

Total.....18.0

The gases will receive 33.4 pounds from the ore, as follows :

O from Fe ₂ O ₃ , SiO ₂ , &c.....	21.46
H ₂ O.....	11.94

Total.....33.40

Hence we may write the composition of our ore thus :

Pig iron.....	50.6
Slag.....	18.0
Gases.....	33.4

Total.....102.0
Less C from coke.....2.0

Balance.....100.0

Now let us proceed to find the quantity of heat that 100 pounds of ore will absorb during heating, reduction and fusion, and arrange our results in tabular form for convenience. The first column of Table I states the substance or reaction, the second the amount in pounds, the third the calorific factor, the fourth the total amount of caloric required. The factor for heat of decomposition in the third column is that found in the fourth column of the table of heats of decomposition of substances met with in blast furnace practice, given in Part I of this paper. The

use of the specific heat factors has been explained in the description of the table of specific heats. These specific heat factors have been corrected for a temperature of 1500° C. by having the increments added according to the formula already given, when such increments are known. The last column is that in which we are most interested. It gives the quantity of heat required to perform the work indicated in the first column upon our ore.

Table I.—Ore.

Reaction.	Pounds.	Factor.	Calories.
Moisture, Latent H. evaporation.....	0.61	607	370
Moisture, Sp. H. 40° to 100° C.....	0.61	60.7	37
Moisture, Sp. H. 100° to 225°.....	0.61	103.6	63
[Fe ₂ O ₃ + y H ₂ O].....	78.47	400	31,388
Comb. H ₂ O, Sp. H. 150° to 325°.....	11.33	79	895
[Fe ₂ + O ₃].....	67.14	1,200	80,568
Fe ₂ O ₃ , Sp. H. 40° to 1500°.....	67.14	351.8	23,620
Iron, Latent H. fusion.....	50.60	46	2,328
Slag, Total H. fusion.....	18.00	450	8,104
[Si + O ₂].....	2.50	3,410	8,525
O, absorbed by iron.....	2.00	4,115	8,230
[P ₂ + O ₅].....	0.46	2,618	1,296
[Mn + O ₂ + H ₂ O].....	0.13	1,108	144
Gases, Sp. H. (° to 325°.....	33.40	77.5	2,588
Clay, Sp. H. 40° to 1500°.....	7.00	0.2836	2,898
SiO ₂ , Sp. H. 40° to 1500°.....	12.60	0.1883	3,849
MnO ₂ , Sp. H. 40° to 1500°.....	0.13	0.1590	31
CaO, Sp. H. 40° to 1500°.....	0.50	0.2710	198
MgO, Sp. H. 40° to 1500°.....	0.10	0.2440	33
Total heat required by 100 pounds ore.....			175,315

The Consumption of Rails in France.—American producers of steel rails are much disappointed when the requirements of the roads in this country fall below 1,000,000 tons per annum. To them the quantities used on French lines must seem pitifully small. The following statement by the Comité des Forges de France shows the consumption of rails for a series of years:

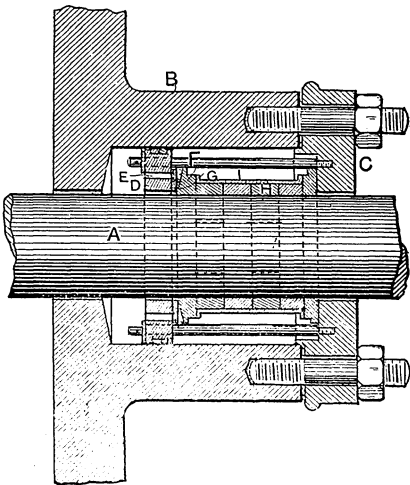
	Metric tons.	Metric tons.
1869.....	183,628	1887.....108,898
1875.....	217,546	1888.....93,868
1880.....	208,553	1889.....58,046
1883.....	341,334	1890.....66,844
1884.....	284,081	1891.....112,857
1885.....	249,415	1892.....163,840
1886.....	170,595	1893.....129,338

The French requirements of 1893 would keep a modern American mill fairly busy for six months.

The Analytical and Assay Laboratories of Dr. Gideon E. Moore, at 221 Pearl street, New York City, have had their facilities enlarged by the addition of a Department of Physical Tests, under the direction of Chas. F. McKenna. The testing laboratory is equipped with machines of the latest and most improved construction for determinations of tensile, transverse and compression strength of iron, steel and other metals and alloys, cement, building stones, timber, &c., and for determining the lubricating value of oils. This is the only commercial laboratory in this city affording facilities for investigations of the chemical and physical properties of all materials used in engineering and the mechanical arts.

Metallic Rod Packing.

This packing, made by John Wood, Jr., Drexel Building, Philadelphia, has been found to remain tight after several months' use. It is intended for the piston rods and valve stems of steam engines, pumps and the like. It consists of a metallic ring or seat, D, placed in the stuffing box B, and provided with an annular series of pressure admitting ports or passages, E, in communication with the cylinder. A flexible diaphragm, F, of metal is placed next the seat D, within the stuffing box, and covers the series of parts, as shown. A second ring, G, is provided with an annular shoulder having an offset in contact with the diaphragm F, which, under pressure communicated through the ports, is forced away from the ports, thereby admitting initial pressure to the



Metallic Rod Packing.

space about the packing. The series of split rings, H, are arranged to break joints and are incased in the bull ring I, which is split longitudinally. The pressure admitted to the space about the rings presses them against the rod A.

Nothing so thoroughly indicates the prevalence of the hard times, observes a New York journal, as the result of some of the assignee sales recently. The debtors in many cases are men against whom no judgments are lodged, and against whom a legal process would be apt to result in collections. Notwithstanding this, however, the average speculator in doubtful debts and unsalable securities takes no chances. The schedule of valuable assets in the hands of men who make a business of buying up claims reveals an amusing lack of public confidence. Men who are known to be successful in business, of undoubted credit, but possessed of no apparent security, find themselves cheapened, and in many cases discredited, by the values placed upon their obligations put up at auction.

The Marinette Iron Works Company of Duluth have resumed operations with about 200 men, having closed a number of new contracts, the largest of which is a \$100,000 saw mill and box factory to be built at New Orleans for the Standard Oil Company's tract. The establishment has work enough to keep it fairly busy for the next six months.

CORRESPONDENCE.

Steel Plate Rolling in Great Britain.

To the Editor: A kind friend of mine in this country has been good enough to forward me a copy of your issue of December 7, which contains a critical article on the above subject. Your correspondent's name is not appended to his article and consequently I have not the honor of knowing who my adversary is. It is always pleasanter to know this.

The paper to which your correspondent refers, and criticises adversely, was read at the autumn meeting of the Iron and Steel Institute, at Darlington, in England, on September 27 last. The present writer is the author of the paper in question. Its title was "Suggested Improvements in the Manufacture of Steel Plates."

With your kind permission, I beg to be permitted to reply to some of your correspondent's remarks thereupon. To begin with, your correspondent is right in assuming that the steel spoken of in the paper is that which is made in the open hearth furnaces of Great Britain, the Siemens acid steel being more in the author's mind at the time of writing than any other class. Your correspondent arrogates to himself a very lofty pinnacle of advancement in the course of his criticism. The paper read at the Iron and Steel Institute meeting is, according to him, not only devoid of instructive features, but lacks freshness as well. The process of plate rolling described therein has been a success in the United States since 1881. Just so; we shall see as we proceed how far this is correct. It is satisfactory to learn, however, from the same source, that the paper has at least one redeeming feature—it is amusing. Its function has been found for it, and the paper has, therefore, not been written in vain. Humor, it appears from certain authorities, is scarcer in the world than is generally supposed, so that, properly considered and with all allowances made, your correspondent has, whether intentionally or not, paid me a very high compliment and I beg to assure him that I accept of it in, I hope, a becoming spirit of humility and thankfulness.

At the same time, however, I cannot allow your correspondent to run away with the notion that American steel manufacturers can roll plates direct from ingots more successfully than has been done, when tried, and for a time carried on by manufacturers in the United Kingdom. This system was tried, and well tried, too, over and over again, on the identical lines indicated by your correspondent, but with two, instead of one, stands of rolls, in our ordinary plate mills, which does not affect the principle. My object in reading a paper on the venerable subject of direct plate rolling was for the purpose of resuscitating the matter, and, at the same time, to endeavor to show that a better plan to effect the purpose had been found out than on the lines hitherto adopted for rolling plates direct from ingots, and which were nearly all similar, in this country, in their conception and execution. I have a faint notion that your correspondent may just possibly be calling a success in America what would probably be regarded by we, so-called backward, Britishers as a comparative failure. This will doubtless commend itself as a piece of British conceit. I

further gather from your article that there is only one plate mill in America of the type referred to by your correspondent. Now, this strikes one as curious. Naturally, and to judge from its phenomenal success, a "boom" should have taken place on this type of mill. If my information be correct the opposite is the case. I find it recorded in the special volume of the British Iron and Steel Institute in America in 1890 (nine years after the period referred to by your correspondent), in reference to Homestead Works—your leading steel industry—in laying down the new open hearth plant, that there is a slabbing as well as a finishing mill.

This makes the state of matters more curious still. It is further stated that it used to be the custom to rough and finish the ingot in this plate mill similarly to what was done in Great Britain when various manufacturers made the trial. But the method has been abandoned long ago. And this is the most curious thing of all. One would have expected that your correspondent would have made himself aware of the most modern practice of your steel manufacturers before writing up an ancient method of producing steel plates of no real practical value. Let me inform your correspondent that the method of plate making now practiced at Homestead works is identical with the present British methods. Our plate manufacture in this country is of a much heavier class, generally speaking, than in America, and requires a heavier class of machinery. The system spoken of by your correspondent, if adopted in Great Britain, would be not only unsatisfactory, but actually unworkable where large and continuous outputs are a necessity. The variety of plates required for British, to say nothing of foreign wants, is such that to cast a separate ingot in anything approaching to such practice as your correspondent's system requires for the rolling of each separate plate would mean having to use an amount of ingot molds not only appalling in itself, but quite impracticable in actual work. I am aware that your correspondent mentions that small plates are occasionally got off the large ones, which, of course, tends to reduce the scrap, and probably the number of molds to be used, but this is mere chance work, and compels the class of plates to be rolled to accommodate itself to the system of production, instead of *vice versa*. Any proposed system of direct plate rolling must inherently be indifferent to whatever sizes of plates come to hand, in so far as the rolling of such would prejudicially affect the economy of the process.

The method championed by your correspondent is therefore wrong in principle, because it is not based on a true appreciation of the rolling conditions necessary to sound economical production, and applies with equal force to both countries. It was abandoned in Great Britain whenever these drawbacks were discovered. British steel makers, quick to discover a difficulty, and as quick to get over it, adopted separate cogging so as to work with heavy ingots and a restricted number thereof. This enables them to cut several slabs from the same ingot to exact weight, or nearly so, in order to minimize scrap on the finished plates. This method contains the right principle; it not only abounds with recommendations, but comes very near perfection. Great Britain knows this; America has discovered it also, and has adopted it, which sweeps the one stand of rolls mentioned by your correspondent and

the direct plate rolling to the wall. In my humble opinion, however, I have ventured to say before the most scientific institute of our country that it contains one drawback, fortunately not beyond remedy—it necessitates the reheating of all the slabs before finishing into plates. I am now of the belief, as a practical steel maker, and as a result of developing experience, that the cogging, roughing and finishing, including the cutting of the slabs to weight, may all be done right away in one operation, provided the requisite speed and power of plant are laid down to carry it out. To do this, however, the cogging mill must not be apart from the plate mill, but must form a part of it, concentration of plant being necessary to save heat in the ingot. This constitutes in its mechanical aspect, although other conditions are also necessary, my proposed new direct method of rolling steel plates, and the writer of your article will now see how very far from the mark he is when he states that "from an American point of view, the paper presents many amusing features, the principal one being the earnestness and gravity with which a process of rolling steel plates is discussed, which has been a success to the writer's knowledge since 1881 in the United States, was tried in Scotland in 1884 and abandoned as a failure." Now, your correspondent mentions that the American manufacturer referred to by him did his direct plate rolling in one stand of reversing rolls. How delightfully simple as compared with our cumbersome method (including Homestead's also) of slabbing first, then reducing the slabs in roughing down (soft) rolls, occasionally made in steel, and finishing the plates by passing through chilled rolls. The one stand of rolls method is feasible enough, in a kind of a way, I admit, but for the production of a well finished plate with a good surface, which is our first consideration, it is quite out of court. I will await with the liveliest interest to know whether the rolls in the single stand were of chilled or soft grain metal. If of soft grain metal, I have no hesitation whatever in saying that the plate surfaces produced would not be accepted in British markets unless, perhaps, for the thickest classes of plates. If of chilled metal, I cannot see how such could continuously stand the heavy drafts without breaking, which, of necessity, the rollers would require to use in breaking down the ingots (the thickness of which your correspondent might kindly furnish), in the earliest passes especially, and rolling the same direct off into finished plates. It would also be instructive to know what the continuous daily output of the mill he refers to was, say for six months. A process of ingot chipping is also necessary, it appears, previous to rolling in order to produce good surfaces in the plates. This is an objectionable piece of work, adding to costs, and ought to be unnecessary. It is, however, but a further evidence of the weakness of the method approved of by your correspondent. Manufacturers in this country have repeatedly tried to roll off plates from slab ingots in the manner conveyed by your article, but in two stands of rolls (same as at Homestead Works)—that is, soft and chilled rolls, constituting the ordinary type of a finishing plate mill. This method involves, in common with your American practice, the extensive variety of ingot casting I have already spoken adversely of. There isn't the slightest doubt, however, that the method doesn't pay in spite of every care. In-

deed, by the very nature of things, a very high percentage of scrap and a comparatively low output are inevitable. This was exactly the experience of the method when exhaustively tried by many British steel manufacturers. The great saving to be effected by avoiding a process of reheating, the absolute directness of the method, to say nothing of many other advantages to be gained by success, were all so palpable, that it was with no light heart, I assure your correspondent, that steel makers here ultimately abandoned the method on the lines indicated. To this extent, therefore, in reviving the question of direct plate rolling, I am whipping up a dead horse, but on a different footing, so to speak, than formerly. I have already explained that I am convinced that if for existing plants higher speed plate mills and cogging mills are substituted, and the said plant is kept combined together as one whole, and not separate as at present, that direct plate rolling in one operation, with the highest degree of economy, can be successfully done. The principle is carried out now in angle and bar rolling, and also in rail rolling. Why not apply it to plates, I ask, and this is the question I have set myself to endeavor to answer. If angles and rails can be rolled in multiple lengths of 200 or 300 feet, and sawn into finished lengths, why cannot plates also be rolled in multiple lengths of 90, 100 or 120 feet on the same principle and sheared into finished lengths? The thing is quite practicable on the lines I have indicated. The general argument is that in plates surface has to be dealt with. Quite so. My reply to that is, produce the mechanical speed and power necessary to deal with this condition, and the difficulty is solved. In order to the more perfect economy of the method I propose, it is necessary that the slabbing rolls should be so designed that small billets, as well as slabs, could be produced. This is wherein scrap would be saved in the slabbing process. As already mentioned, plates would require to be rolled in multiples or long strips in the same manner as angles, and more especially so among the lighter classes of plates. The multiple plates, on leaving the finishing rolls, would be run on live rollers on the mill floor level, and cross sheared approximately to lengths while hot, under specially designed vertical cutting shears, with legs sufficiently apart to take in the widest plates to be rolled. When the plates become sufficiently cold they would be taken up and sheared on their sides and ends, where necessary, to actual sizes in the usual way. This would completely obviate the loss in scrap in shearing which your correspondent fears would arise in small plates. It follows, therefore, from what I have written, that in order to carry out my method of direct plate rolling satisfactorily, the first thing to be done in handling a batch of specifications of plates would be to separate the plates into groups according to their thickness. Having done so, the plates would then be classed into groups according to their widths.

Having thus grouped all the same thicknesses and widths together, the plates would then be rolled in multiples to any length considered practicable. The latter question would be decided by three factors, viz.: The width and thickness of plate (or multiples thereof) to be rolled, considered along with the mechanical power at command, the requisite heat on the ingot being assumed. Having arrived at this point and with a further concluding remark, it should,

I think, be obvious that the method of plate rolling I advocate is both a good and economical one. It can also be carried on with a very few different sizes of ingot molds. This condition is, I am well aware, essential—in fact, indispensable—to success in any system of plate rolling, direct or otherwise. It is brought about by the method I propose, from the fact that the plates in average or light sizes are to be rolled in multiples and the cogging rolls are to be so graduated that small billets from the top ends of the ingots are to be produced as well as slabs. Thus plates are to be rolled off and billets are to be made all in one operation and one heat. It matters little, therefore, whether the piece from the top end of the ingots weighs 3, 6, or even 9 hundredweight, it becomes a good, serviceable billet. There is no undue addition to scrap by the conditions just named, even using the same weight of ingot in each case. To carry my method, however, to the limit of perfection, the billets ought to be taken off in the same way as the slabs and also rolled off, but into finished angles or bars, which would be quite practicable if the angle and bar mill or mills were set down at the right spot in relation to the cogging rolls.

Assuming for a moment just before finishing, for the sake of argument, that the new method of direct plate rolling from the ingot I have advocated is practicable in all its working details, there would be a large saving in the first instance—assuming a new plant were to be erected—in capital expenditure in reheating furnaces and collateral plant. No doubt for the method, heavier, stronger and speedier engines and mills would be required, and such would, of course, swallow up some of the aforementioned saving. But first cost in plant is very secondary as compared with a saving in cost of manufacture. As an example of this, 1½ pence per ton of saving would cover, on interest, at the rate of 5 per cent. per annum, an extra capital expenditure on engines and mills, &c., of, say, £5000 on a weekly output of 1000 tons of finished plates. I estimate by the method I have described a saving in fuel, labor and general outlay in various directions, and also by the increased output due to the simple directness of the method, of about 5 shillings per ton of finished plates in this country. It would, of course, be proportionately greater in America. In conclusion, if any American manufacturer, tempted by the economy to be effected by what I have set forth, is prepared to either modify existing rolling plant or to put such down afresh, I will be glad to come across, for bare expenses in the first instance, to America and demonstrate in actual practice my proposed new method of direct steel plate rolling. Apologizing for the length of this communication, I am yours truly,

WM. MUIRHEAD.

FLEMINGTON, MOTHERWELL, SCOTLAND,
January 22, 1894.

Thomas Sands of Nashua, N. H., is putting on the market galvanizing kettles which are welded instead of being riveted. The body is made of one piece and the rim is strengthened by a heavy steel bar. All danger of breaking is thus avoided.

The Bethlehem Iron Works, Bethlehem, Pa., shipped to Washington Navy Yard last week 42 tons of 5, 12 and 13 inch gun material. The first 13-inch gun made at Bethlehem for the Government will be tested at Indian Head this week.

The Frick Coke Scale.

In a recent issue of *The Iron Age* we gave a summary of the rates of wages proposed in the new scale of the H. C. Frick Coke Company, which became operative on February 1. We have since been furnished with a copy of the scale in full, and which is as follows:

Frick Sliding Scale in Connellsville Coke Region.

For the regulation of wages and prices of labor to be paid by the H. C. Frick Coke Company to their workmen at — plant, and the conditions under which the workmen agree to work at said plant:

When the market price of Connellsville furnace coke is \$1.15 per ton of 2000 pounds, f.o.b. at ovens, the wages and prices paid for labor by said coke company to the workmen at said plant will be as follows:

	Per 100 bushels.
Mining and loading room and rib coal.....	\$0.78
Mining and loading heading coal..	.88
Mining and loading wet heading coal.....	.95

Heading price to be paid for turning rooms in a distance of 30 feet from center of heading.

All coal to be mined by measurement, at the rate of 2688 cubic inches to the bushel. The wagons used in the mine shall be as nearly uniform in capacity as practicable and have the capacity branded on each. To be accepted and credited to the miner at the branded capacity, loaded wagons shall not be less than plump level full at the pit mouth or tippie, the place where the checkman for the miners and the checkman for the company inspect them.

	Per full run.
Drivers and rope riders (shaft and slope mines).....	\$1.65
Drivers and rope riders (drift mines) ..	1.60
Cagers.....	1.65
Trappers.....	.50
Dumpers and tippemen.....	1.35

A "full run" not to exceed an average of nine hours' actual work; but all "full run" hands must remain at work until all the ovens are charged, and all the work for the day is finished, if the management so elect, and they shall be paid the *pro rata* rate per hour for all extra time worked over an average of nine hours per day, each two weeks. This extra time to be computed and placed to the credit of the men at the end of the two weeks.

Tracklayers, blasters and timbermen.	\$1.65 per day of nine hours' actual work
Assistant tracklayers, inside laborers, &c.,	\$1.35 per day of nine hours' actual work
Drawing coke, \$0.42 per 100 bushels charged	
Leveling.....	\$0.08 per oven
Chargers with horses and mules.....	.03 per oven
Chargers per day, ten hours' actual work.....	\$1.40
Charging engineers,	\$2.00 per day of ten hours
Teamsters.....	1.30 per day of ten hours
Carters and yard laborers,	\$1.20 per day of ten hours
Forking cars over 40,000 pounds capacity.....	\$0.95
Forking cars 40,000 pounds capacity...	.85
Forking cars less than 40,000 pounds capacity.....	.75
Forking small open top cars from yard	.80
Forking medium open top cars from yard.....	.95
Forking large open top cars from yard	1.10

It is understood and agreed that the rates of wages and prices of labor given above are to be the minimum, or lowest rates and prices paid by the said coke company, at said plant, during the term of this agreement, and for

each and every advance of 10 cents per ton in the market price of Connellsville furnace coke over and above \$1.15 per ton of 2000 pounds, f.o.b. cars at ovens, 3 cents per 100 bushels shall be added to the above price for mining and loading coal; $1\frac{1}{4}$ cents per 100 bushels coal charged to the above price for drawing and loading coke; $\frac{1}{2}$ cent shall be added to the above price for charging ovens with horses; $\frac{1}{4}$ cent per oven to be added to the above price for leveling, and $2\frac{1}{2}$ per cent. shall be added to all other prices of labor given in above list.

Machinists, mechanics of all kinds, engineers, pumpers, firemen and all other classes and kinds of labor regularly employed at said plant, not mentioned above, to be paid according to the work they perform, ability required and responsibility of the positions. Payments to be made semi-monthly.

The said coke company shall at all times have the right to say how and when the plant shall be operated, and the right to employ any person or persons they desire to employ, and no others.

There can be no such thing as a strike under this agreement for any cause, and suspensions of work by the workmen at said plant shall not be allowed for any cause during the term of this agreement, without the consent of the management. In case of any dispute or trouble between a workman and boss, or any grievance growing out of or in connection with the work, that any workmen employed at said plant may have, a written statement of said dispute, trouble or grievance, signed by five workmen employed at said plant, shall be given to the superintendent of said plant at his office. If the superintendent fails to make a satisfactory adjustment of the matter complained of within five days after delivery of said notice to his office, it shall then be immediately submitted for settlement to three persons, one of whom to be selected by the workmen, one by the superintendent of the plant, and the two so chosen shall choose the third, and the decision of those three, or a majority of them, shall be final and binding on both parties.

It is hereby agreed by and between the H. C. Frick Coke Company and the undersigned workmen who are now or may hereafter be employed at their — plant, that the above scale shall go into effect February 1, 1894, and shall remain in force for and during the remainder of the year 1894 and thereafter until notice has been given as provided in the following: The said H. C. Frick Coke Company must give notice in writing on or before December 1, 1894, if they desire to terminate this agreement on January 1, 1895, and the workmen must give written notice to the superintendent, signed by a majority of the men employed at said plant, on or before December 1, 1894, if they desire to terminate this agreement January 1, 1895. If such notice is not given by either party on or before December 1, 1894, as above provided, then this scale shall remain in effect and be binding on both parties until January 1, 1896, and so on from January 1, 1896, to January 1 of the next succeeding year or years until such notice shall have been given by either party as above provided.

The Pennsylvania Railroad Company will build a spur from the main line to the works of the Johnson Company near Johnstown, Pa.

THE WEEK.

Japan is now supplying the Chinese market with several classes of goods which China formerly obtained from Europe or America.

An ocean race of 14,000 miles came to an extraordinarily close finish last week in New York harbor. The race was between a Boston bark and a Nova Scotia ship, both of which left Hong Kong in October last. The Boston vessel had been anchored but one hour when her rival appeared in port.

A Paris dispatch says that General Mercier, the French Minister of War, has decided that the canned goods for the use of the army shall in the future be exclusively of French manufacture. Hitherto they have been furnished by Americans, who held a monopoly of the business.

The price of wheat in Chicago reached last week the lowest point on record.

Many protests have been forwarded to the Secretary of the Navy by the unions of machinists, boiler makers and other iron workers, against the proposed reduction of wages in the navy yards.

Rumors are current of a deal by which grain shipments from 3500 miles of the Chicago & Northwestern Railroad system will be sent to Europe by the new export line formed by the Newport News line of steamers and the Chesapeake & Ohio and "Big Four" railroads.

The detrimental effects of the coal strike in England are apparent in the yearly returns of British coal exports, which were \$10,800,000 less in value last year than those of 1892.

An Industrial Exhibition of Engineering and Mining Inventions and Manufactures is to be held in April and May in Birmingham, England.

The special police census of the unemployed in New York City shows the number of males out of employment to be 52,592 and of females, 14,688, making a total of 67,280. These persons belong to 41,981 families, comprising 206,701 persons in all.

British Board of Trade returns for the year ending December 31, 1893, show a large decline in the foreign trade of Great Britain. The total imports for the year were \$1,944,464,112, a decrease of \$89,876,122 as compared with those of 1892 and of \$145,783,555 as compared with 1891. The value of British exports in 1893 was \$1,048,768,381, a falling off of \$41,187,874 from those of 1892 and of \$137,946,739 from the exports of 1891. The returns for the month of January make a more favorable showing than has been the case for some time past. Imports during the month increased \$25,584,000 as compared with the corresponding month last year, and exports increased \$624,000, compared with those of January, 1893.

As an illustration of the close economies carried out by railroad companies last year, Chief Engineer Joseph T. Richards of the Pennsylvania Railroad is quoted as saying that in the Maintenance of Way Department of that road alone \$1,700,000 was saved last year—that is, that much less was spent than in 1892.

The foundering of the United States corvette "Kearsarge" on Roncador Reef removes from the navy list one of

the most notable of our historic war vessels—"he conqueror of the rebel cruiser "Alabama." At the time of her loss the House Committee on Naval Affairs had under consideration the insertion of an item in the naval appropriation bill for 1894-5, providing that the old "Kearsarge" be repaired and put in as good a condition as possible.

The much agitated scheme for the consolidation of New York City and Brooklyn and the absorption of adjacent towns so as to form a "greater New York," appears to be in a fair way to be realized. A bill for this proposal passed the State Assembly last week by an almost unanimous vote.

It is but a short time since New York builders were bewailing the utter absence of life in their line of business. A New York City journal reports, however, that cheap building materials are now causing "an epidemic of office buildings and apartment houses."

The number of immigrants landed in New York in January was 5492.

Plans have been accepted and work will, it is stated, be immediately begun on the new building for the American Surety Company, at Broadway and Pine street, New York City. It will be another mammoth erection, and will overtop the Manhattan Life's new structure near by, on Broadway, which is one of the tallest houses in existence. The tendency to the erection of these "sky scrapers" has become very marked in New York of late years.

A new weekly line of steamers will be run by the Johnston Company of Liverpool between that port and Mont real this summer.

It is announced that the new United States cruiser "Columbia" will go into commission about March 1.

A Detroit millionaire will, it is stated, establish a co operative colony.

Cotton seed oil will now be shipped in bulk, like petroleum, on ocean steamships. The pioneer vessel for this new commercial departure was lately launched at Port Glasgow for the American Cottonseed Oil Company. The new ship, named the "Aco," is 345 feet long, 43 feet beam and $22\frac{1}{4}$ feet depth of hold, and is built throughout of steel. She is so designed that she can carry either a liquid or general cargo, or both at the same time. There will be room for 500,000 gallons of oil in her holds besides about 1000 tons of general cargo.

Germany is beginning to feel the effects of the immigration of pauper aliens into that country. The German Government have just issued some strict regulations governing the passage of Russian and other emigrants through the Fatherland on their way to the United States in order to prevent them from settling in Germany.

President C. P. Huntington of the Southern Pacific Railroad has approved the plans and signed a contract with the Phoenixville Bridge Company for the construction of a new bridge for the company's line over the Mississippi near New Orleans. The bridge, which will cost \$5,000,000, will be 10,500 feet long, with a double track. It will be built on the cantilever principle, and will be one of the largest bridges in existence. The object in its construction is to give the Southern Pacific an all rail entrance into New Orleans.

The Iron Age

New York Thursday, February 15, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Live Up to Your Contracts

Manufacturers of bar iron who secured large season contracts last fall from implement makers are being annoyed by the withholding of specifications. At the time these contracts were made the iron market was declining, but the same conditions had prevailed the previous year and the buyers presumed that, as before, they were guarding sufficiently against a decline by securing rates considerably under current prices for sharp delivery. The figures made on season contracts in 1893 were, in fact, so much lower than the then very low open prices that unsuccessful competing bidders thought that those who took the work were likely to suffer serious loss in filling the orders. Up to that time prices had never been so low in the West, and the buyers esteemed themselves fortunate in thus reducing the cost of so considerable a part of their raw material. Contrary to all expectation the bar iron market has since gone considerably below the range of the contract prices. If all these orders were being taken out as they were placed, in good faith, the contracting mills would be in good shape with such back logs. For instance, some contracts were known to have been negotiated at 1.45 cents delivered, which if placed now would probably be done at 1.25 cents, or at most 1.30 cents. But these contracts have not proved to be a safe reliance. There are cases, undoubtedly, in which the purchasers have found the operation of their works inadvisable and, therefore, have not specified for iron because it was not needed. But in some instances, too numerous to be pleasant, the contracting parties have deliberately ignored their agreements and have purchased material elsewhere at reduced rates. The temptation to throw overboard their obligations and save \$3 to \$4 per ton has been too great, and they have yielded to it at the sacrifice of their business honor. The defense cannot be set up that this course is necessary on account of the excessive competition on their own products, which renders it necessary to resort to every method for cheapening the cost of construction. Some of the most conspicuous offenders are makers of specialties. On the other hand, in shining comparison with these recalcitrants there are honorable concerns making staple goods in the implement line who are living up to the letter of their contract, and are thus doing as

they would be done by. It is recognized as a very difficult undertaking to enforce a contract of this character, but commercial honor should deter business men from deliberately ignoring an agreement made in good faith, and which would be rigorously upheld if the market had gone the other way.

New Tin Plate Champions.

That section of the political press of the country which but a short time since wholly ignored the existence of a tin plate industry has suddenly become converted. The conversion is hardly as miraculous as was that of St. Paul, but it is evidently as sincere, for which there is some reason to be thankful. The exigencies of politics have compelled the wise editors of these sheets to make the condition of trade throughout the country appear as favorable as possible. When factories start up which have long been idle, each item of the kind is paraded as an evidence of the returning prosperity of the country, even if but half the usual force is put to work and at but half or two-thirds of the wages paid when the concern was forced to shut down. Every manufacturer who thus endeavors to keep his machinery from rusting out, or who is desirous of helping his dependent workmen to get the means of subsistence, is heralded as "not afraid of the Wilson bill." But the most delight, curiously enough, is shown whenever a new tin plate project is brought forward, or an established tin plate concern decides to make some improvement in its facilities. This "child of the McKinley bill," which was dubbed as a bogus industry by Chairman Wilson, was marked for destruction at one time. It was maligned in every way and its very existence denied by the rabid opponents of any sort of protection. It is such a lusty infant, however, that it has compelled its existence to be recognized, and now its whilom defamers have become, in a certain sense, its champions. They will not advocate the retention of high protective duties for it, of course, but they are educating their readers to the fact that an American tin plate industry really exists. In this respect, therefore, a great deal has been gained, as the tin plate question will very probably disappear from future political campaigns as one of the great issues.

The majority of the mechanics of Philadelphia are in a better condition, financially, to struggle with hard times than those of any other large city in the United States, and probably in the world. This is largely due to the fact that there are thousands of small houses in all parts of the town which can be bought at reasonable prices. A small first payment will obtain the deed, and the other payments and the interest are so adjusted that the annual sum exceeds by a small sum the rent charges. Practically the purchaser is given his own time in which to pay for

the home. He can pay a fixed amount yearly, and in addition he can reduce the principal at any time and by any sum he chooses. What is of first importance is that this system provides the incentive to economy. He cannot obtain a home in a city like New York, where he can obtain apartments at any desired rate, but in a building he never dreams of owning, as its value so far exceeds his means. The difference is that between small independent houses and those built on the tenement house plan. Therefore in times like the present the Philadelphia mechanic has some resources, in the shape of real estate paid or partly paid for, which will carry him until trade improves. Having acquired the habit of saving for a particular purpose, he can now reduce his current expenses to a greater degree than if he had never learned how much a dollar was worth.

Southern Iron at Chicago.

One of the important results of the great depression in the iron trade, and the enforced economies which it has brought about, will be the narrowing of the market in the Northwest for Southern pig iron. There have been times in the past when the coke furnaces along Lake Michigan seemed destined to drive Southern iron back to the Ohio river. Cheap Lake Superior ores and cheap coke were the factors contributing to this result. But as trade revived the cost of ore and coke advanced and another lease of Northwestern market privileges would be secured by the furnacemen of the South. Now, however, prices of these raw materials, as well as wages and transportation charges, have been reduced to a lower level than ever before, and cheap pig iron in the Northwest appears to be permanently assured. According to the figuring now being done by those in the trade, pig iron will be made this year along the shores of Lake Michigan at such low cost as to be almost startling when compared with the basis existing only a year or so since. It would be violating confidence to give the figures which have been communicated to us, but it can safely be said that if the Chicago furnaces should become aggressive in seeking new territory the Ohio river towns would become debatable ground, even at the very lowest prices which have thus far obtained on Southern foundry grades.

While this is a gloomy prospect for Southern furnacemen, it is correspondingly encouraging to their Northern competitors. To these it means an enlarged consumption of the products of their furnaces, as the displacement of the very considerable shipments of Southern iron into their territory will assist in making up the shrinkage in their trade from normal conditions. The Chicago and Milwaukee furnaces are also natural heirs in this era of very low prices of quite a volume of business possessed not long since by charcoal furnaces, many of which are

defunct and likely to remain so until some very great wave of prosperity carries all values skyward. The sudden change in the steel trade which has taken place at Joliet, where a whole year of absolute quiet has been succeeded by very great activity, is generally accepted as a precursor of what may be expected to happen in the Chicago pig iron trade at a reasonably early day.

Freight Discrimination in the Iron Trade.

Reports of a very serious abuse are arousing a good deal of indignation in the iron trade. It is charged that a few very large manufacturers in the Pittsburgh district are getting special rates of freight, which are denied to other great producers in the district. It is charged that the forms of the law are nominally complied with by publishing these special rates in a small local paper printed in a suburb, in which one of the large works is located. Suspicion was aroused some time since that something was wrong by the persistency with which those apparently favored declined to quote at any other terms than delivery at buyers' locality. The suspicions have since been ripening into the conviction that some underground work is being done with freight rates to the advantage not alone of one section, but to a very small number in the favored district. We need hardly state that such a conspiracy to place competing sections and rival manufacturers at a disadvantage is disgraceful to the management of the railroads engaged in it. It saps the very foundation of all honest effort. If freight rates are to be the subject of negotiation for every individual transaction, well and good. But then two manufacturers who are figuring on shipping the same amount of material for the same contract should be placed on the same footing and should have the same rate named to them. Favoring one section and giving advantages to one or more concerns naturally begets the suspicion that other considerations than the welfare of the railroad corporation are shaping the course of railroad managers. Public opinion will not countenance such a conspiracy to crush out competition.

A vigorous and emphatic protest should be made by the manufacturers who are being made the victims of such methods. Where interstate traffic is involved an appeal to the Interstate Commerce Commission should be promptly made, while a public address should be sent to the presidents of the railroads who are permitting such practices within the State of Pennsylvania. It is a vital question to the great majority of the manufacturers, who should not allow one stone to remain unturned until this alleged discrimination stops.

All sorts of devices are adopted during the present depression to capture orders, but fortunately are not always

successful. It is pleasant to note that the system of "going it blind" received a set back last week in Philadelphia. A concern in Western Pennsylvania tried to take the order for a small amount of ship material by bidding "\$1 per ton less than the lowest bid" received by the buyer. The latter declined to consider it, and the work went to another mill.

W. J. Keep of Detroit, who is an acknowledged authority on the relation between the chemical composition of pig iron and its value for foundry work, rides roughshod over the pet notions of some of our progressive foundrymen. In his paper before the Foundrymen's Association, which we print elsewhere, he disposes somewhat summarily of the chemist as a regular employee of the founder. We are inclined to believe that he goes a little too far, and should his views prevail he would endanger a good deal of work which is sure to lead to good results commercially. Chemical analysis, however great its shortcomings may be, is certainly a much better guide to the founder than the fracture to which he has hitherto pinned his faith. Possibly the difficulties now besetting the founder will be closer to a solution when he has learnt to draw his molten iron from a tank furnace, with its charge of known composition, instead of taking it in a rush from a cupola into which he has dumped his materials pell mell.

The assertion is made by men with long experience in Washington, and of undoubted loyalty to the cause of protection, that probably the Wilson bill will pass the Senate with some modifications. How far these changes will go seems to be largely a matter of guess work at this early stage, and it will depend upon them whether there will be any radical differences between the two Houses. There has been less talk lately of pursuing a policy calculated to delay action in the Senate, and some leading iron manufacturers have put themselves on record lately as opposed to any action which might prolong the present period of suspense. Their anxious desire is confessedly to escape as soon as possible from the present intolerable state of affairs. They evidently hope that whenever the tariff question is out of the way, even if it is settled in a manner adverse to their interests, business will quickly return to average volume and they will do fairly well.

The sixty-sixth meeting of the American Institute of Mining Engineers will be held at the Princess Anne Hotel, Virginia Beach, near Norfolk, beginning February 20. Sessions will be held on Tuesday and Wednesday evening, Thursday and Friday. On Wednesday there will be an excursion to Newport News, Hampton, Old Point and Lambert's Point. On Friday the Portsmouth Navy Yard will be visited, and Saturday will be given to an excursion to the Dismal Swamp.

OBITUARY.

ABRAHAM GOTTLIEB

The famous bridge builder, Abraham Gottlieb, died suddenly in Chicago on the 9th inst. He was stricken ill while entering the Rookery Building, and died before medical aid could reach him. Mr. Gottlieb was a native of Taus, Bohemia. He was born in 1837. The young man spent ten years at Prague in the university and polytechnic school. After completing his studies he spent seven years railroading, being for two years assistant engineer of the Emperor Francis Joseph Railroad. In 1866 he came to this country and located in Chicago. Mr. Gottlieb soon became connected with the L. B. Boomer Bridge Works, afterward the American Bridge Company. He was their chief engineer until 1872. On severing his connection with this company he became the engineer of the Keystone Bridge Company of Pittsburgh. He had charge of the Western business of the house until 1878, when he was elected president and general manager and moved to Pittsburgh. He resided in Pittsburgh until 1885, and then returned to Chicago and opened an office for himself as engineer and contractor. He has since resided in Chicago, and was consulting engineer of the Edgemoor Bridge Works of Wilmington, Del., and the Mount Vernon Bridge Company of Mount Vernon, Ohio. During his connection with the American Bridge Company he built the first bridge across the Missouri River at Omaha, the bridge across the same river at Leavenworth, and all the bridges on the Missouri, Kansas & Texas Railroad, also the bridges on the Inter-Colonial Railroad of Texas. When connected with the Keystone Bridge Company Mr. Gottlieb built the bridge across the Ohio at Point Pleasant, Va.; the bridge at Henderson, Ky., for the Louisville & Nashville road; the bridge at Plattsmouth, Neb., for the B. & M. road; the bridge at Blair, Iowa, for the Northwestern; the bridge over the Susquehanna for the B. & O.; the bridge over the Schuylkill for the Pennsylvania road, and the bridge over the Harlem River at New York for the Park Commissioners. Since his return to Chicago he built the Broad Street Depot at Philadelphia and the lighthouse for the Government of Mexico in Tampico Bay. He also built the Mexican mining pavilion at the exposition at New Orleans. He built a number of the viaducts and bridges in Chicago, and did work for the Wisconsin Central, Pennsylvania, Lake Shore, Michigan Southern, C., B. & Q. and other railroads. When the work of preparing Jackson Park for the World's Fair was begun Mr. Gottlieb was employed for a short time as chief engineer of construction. Engineer Gottlieb, Architects Daniel H. Burnham and John Root, and Landscape Engineer Frederick Law Olmsted composed the Advisory Board in connection with the World's Fair.

During the whole of his career in America he carried on a great deal of miscellaneous engineering work, and his services were constantly sought when it was desirable to have an authoritative opinion from an expert engineer of undoubted reputation. His skill has left many monuments in Chicago, the steel construction of some of the largest office buildings having been of his design. He was married in Taus in 1866 and leaves a widow and

several children. One of his daughters is the wife of President Greenhut of the Distillers & Cattle Feeders' Company.

In the death of Mr. Gottlieb the civil engineering profession has sustained a great loss. With apparently many more years of usefulness before him, in which greater honors were to be expected through the prestige of a distinguished career, his existence was abruptly terminated.

A. WILLARD HUMPHREYS.

A. Willard Humphreys, at one time the president of the Sterling Iron & Railway Company of New York, died suddenly at Winchester, N. H., on February 9. The deceased was especially interested in scientific matters, and made a special study of them. He was a member of the British Association for the Advancement of Science; of the Sons of the Revolution; the Union League Club of New York; the Long Island Historical Society, and the American Institute of Mining Engineers. At the time of his death Mr. Humphreys was connected with the firm of Bush & Co., brokers, of 50 Broadway, New York.

PERSONAL.

Franklin Farrell of Ansonia, Conn., is the subject of an elaborate article in the New York *Tribune*, in which his possible election to Congress is alluded to.

William S. Eaton has resigned as treasurer of the National Tube Works Company, but remains as director and as chairman of the Finance Committee. A. F. Luke, former assistant treasurer, succeeds him.

J. W. Schaub of the Pottsville Iron & Steel Company, Pottsville, Pa., has resigned.

Arja Williams has been appointed assistant secretary of the Lackawanna Iron & Steel Company of Scranton, Pa.

Enrique Touceda, formerly assistant chemist for the Troy Steel & Iron Company, will be the chemist in charge of a new physical and chemical laboratory which the Walter A. Wood Mowing & Reaping Machine Company are to establish in connection with their plant at Hoosick Falls, N. Y.

F. A. Krupp of Essen, has been elected an honorary member of the Verein Deutscher Eisenhuettenleute.

A destructive fire, the origin of which is unknown, has destroyed the carpenter shop, tin shop, molding room, machine shop No. 2, the bending shop and the large ship shop of the Bath Iron Works, at Bath, Maine. The Slater yacht engine, building there, was somewhat damaged, but the Government ram "Katahdin" and the steamer "City of Lowell," which were at the wharf, escaped uninjured. The big \$50,000 windlasses for the Cramps of Philadelphia were in machine shop No. 2, and were probably damaged considerably. It is thought that the total loss will reach \$150,000. The officials of the company say that the works will never be rebuilt at Bath, but will probably locate at Norwich or New London, Conn. It is possible, therefore, that New London's proposition, made in jest, that the Bath Iron Works transfer their plant to that place, may be accepted.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., February 13, 1894.

Chairman Voorhees said to-day: "The sub-committee in charge of the tariff question in the committee have been at work very faithfully on the House bill, making such changes as they think will improve the bill, but they have not been able to make quite as rapid headway as they counted upon last week. We rather expected the bill before the general committee by this time, but it is a very complicated and laborious task. We are now promised the bill by the end of the present week, and it may not reach us until later."

The members of the sub-committee, Senators Mills, Vest and Jones, say that they have made good progress, but will be several days longer. They are having their greatest trouble with the internal revenue features of the bill, which they are trying to utilize as a means of bringing up the revenue to be derived from it. The sugar duty is also perplexing; but the long list of items under the head of manufactures, and especially iron and steel, have little or nothing to expect.

It is more than likely that the committee will feel themselves compelled to put iron ore and coal on the dutiable list. There is also a great pressure for lumber and a tremendous pressure against free wool. The petitions are pouring in upon the committee and Senate from all parts of the country and cover every interest in the bill. While they show the state of feeling throughout the country, it is not expected that they will have any influence whatever in causing any material changes in the rates.

There have been a number of conferences and an attempt is being made to organize a combine against the bill, but nothing can be done in that line until the measure is before the body. Senator Gallinger of New Hampshire has started a movement looking to a declaration as the sense of the Senate against any legislation on the tariff during the present Administration. If he could get his motion to a vote it would give rise to some interesting disclosures, but the majority will never allow it to reach that point.

The committee will report a substitute for the House bill which will, as they are working now, not materially differ from that measure except in arrangement.

The minority will not attempt any very protracted opposition, but will let it go after setting forth their proposition.

The action of the Senate will hinge somewhat upon iron ore, coal, lumber, wool and sugar. The whisky Senators may also take a hand if the tax is raised.

No one believes that any Senator of the majority will have the courage to vote against the bill on its passage, no matter what shape it is in.

The collapse of the House majority opposition from 35 certain (?) and 54 possible down to 17 has had an intimidating effect upon the week-kneed Senators.

The naval ordnance experts are watching with increasing interest the portable furnace proposed by William Sellers for the assembling of great guns. The proposed system contemplates putting the gun together in three instead of seven pieces. The gun for the experiment is itself an experiment in nickel

for gun making. The new plan involves a great deal of lifting, as the furnace and jacket are carried over the tube at the same time. However, the ordnance authorities are giving the experiment every possible facility.

The Carnegie nickel steel plate of the last lot, which made such a poor showing in the test, was followed on February 10 by a more successful trial at Indian Head of another nickel steel plate 11½ inches thick representing the barbet armor of the monitor "Monadnock," about 300 tons, valued at \$180,000. The plate stood the required test and the lot of armor which it represents will be accepted.

The Ordnance Bureau is getting ready to test the new nickel gun.

Chief Naval Constructor Hichborn has been giving much attention to the weights of the armaments proposed for the three battle ships, "Massachusetts," "Oregon" and "Indiana," and has submitted a statement of his conclusions to Secretary Herbert. The batteries of these ships, as arranged at the Ordnance Bureau, will consist of four 13-inch, eight 8-inch and four 6-inch B. L. R. guns. "These guns," said the Chief Constructor, "will weigh not less than 400 tons, which is an enormous weight to place so high above the water line. Instead of putting two 8-inch guns in each turret, I think one in each would be quite as effective. This would reduce these upper weights about 70 tons."

The Chief Constructor added: "It appears to me that the limit of large guns has been reached, and improvements in powder and projectiles will make the guns of small calibers quite as effective. It is impossible to construct any ship to safely carry such tremendous weights so high out of the water. The turrets and other necessary defensive constructions also add to the weights on the upper deck. This subject of top heaviness, due to excessive armaments, is getting to be a very serious matter. We design ships to carry certain weights of armaments, and to place an extra number of guns aboard of course throws all the calculations out."

Later.—The Senate sub-committee in charge of the House Tariff bill have been unable to complete their labors of revision of that measure as expected and therefore have determined to delay their report to the full committee until next Tuesday's meeting. It is doubtful whether they will be prepared to make their report then, but they are making great efforts to do so. The line upon which they are operating is to secure more revenue, which does not mean a movement in favor of home industries. They have gone over the metal schedule, but have made no changes, although in certain lines they are being much pressed. The sub-committee having completely ignored the attempts of parties interested in coal, iron ore, wool, &c., to say something in behalf of their industries, the majority Senators of the localities most largely interested have been beseeching the sub-committee and have managed to secure an opportunity to get inside.

The minority are making no efforts whatever to secure changes in the House bill, as they know that they would be in vain. The minority of the committee will not attempt to delay the report of the bill to the Senate, but will make a vigorous statement to accompany it, in which they will set forth their views. The manufacturers might as well make up their minds to face the conditions as they are presented in the House bill,

and not permit their operations to be embarrassed by delays in hopes of more favorable conditions. The discussions in the sub-committee have been almost exclusively on the internal revenue provisions. The schedules of manufactures are generally accepted as they come from the House.

The naval ordnance officers at the Washington Gun Foundry are preparing to ship the first of the 13-inch guns to Indian Head for trial. It will require the construction of steel tracks at both places to move the truck to carry the monster gun aboard the barge and to carry it ashore at the other end of its voyage down the Potomac and back again. The test of this gun is looked forward to with great interest by ordnance experts. The powder has caused the delay in the trial.

Corrugated Iron in 1893.

As an illustration of the effect on one of the important branches of the iron industry of the money stringency and the tariff discussion during the summer and fall, and also as showing the decline of trade generally during the year, we are permitted to present the following synopsis of the year's business of one of the prominent manufacturers of corrugated iron and iron and steel roofing:

We compare business of one year with previous years in three ways. 1. Amount in dollars and cents. 2. Amount of tonnage sold. 3. Number of squares sold. Sales for 1893, as compared with 1892, show loss as follows:

	Per cent.
Loss in dollars and cents.....	27
Loss in tonnage sold.....	28
Loss in squares sold.....	24

For the five months of 1893 ending May 31, as compared with the same period in 1892, the gain in dollars and cents was 49½ per cent.

Our first loss in sales for 1893, as compared with 1892, was shown September 30, when the loss was 2½ per cent.

October, November and December of 1893, as compared with the same months in 1892, tell a very instructive story and show the bottom knocked completely out. The results are shown below:

	Dollars.	Tonnage.	Squares.
	Per cent.	Per cent.	Per cent.
Loss in October.....	58	58	54
Loss in November.....	80	79	74
Loss in December.....	86½	80	80

The average loss in the three months, as compared with 1892, being in round numbers as follows:

	Per cent.
Dollars.....	74
Tonnage.....	72
Squares.....	69

This large loss in business was not caused by our being afraid to do business, but simply from the fact that business in our line seemed to be practically suspended.

The Cast Iron Pipe Trade.—Efforts are being made to put the cast iron pipe business into better shape. In a very indefinite way, as one of the leading makers on the Ohio River puts it, the parties who were active in the proposed consolidation last year are again working away at their scheme. Last year the condition of the money market put an end to all the negotiations then pending. For some time the Southern pipe founders have been working under an arrangement so far as their home territory is concerned. They and other producers of cast iron pipe would like to arrive at some understanding concerning the business originating in other sections of the country. As yet the stage of suggestion and discussion has not been passed.

MANUFACTURING.

Iron and Steel.

For the week ending January 20, Edith Furnace in Allegheny, Pa., under the management of John Reis, turned out 1540 gross tons of standard grade Bessemer iron. This is the largest production for any one week in the history of the above furnace.

At Pittsburgh last week the Sharpsville Furnace Company, Sharpsville, Pa., entered suit against the Allegheny Bessemer Steel Company to recover \$5454.53 for pig iron sold and delivered to the defendants.

Nearly all departments of the different plants of the Riverside Iron Works, at Wheeling and Benwood, W. Va., were in full operation last week.

One of the largest electric cranes in the country has recently been constructed in the open hearth department of the Homestead Steel Works, Homestead, Pa. It is stated to be capable of carrying an ingot weighing 150 tons.

It is stated on good authority that the Aetna-Standard Steel & Iron Company, Bridgeport, Ohio, are perfecting plans with a view of engaging in the manufacture of tin andterne plate.

The plant of the Eagle Iron & Steel Company, Ironton, Ohio, manufacturers of muck bars and iron and steel sheets, is in operation, though not to full capacity.

In the Circuit Court at Indianapolis, Ind., a decision was given in the suit of the Iroquois Furnace Company of Chicago, against the receiver of the Premier Steel Works, to recover possession of 456 tons of pig iron sold the failed concern by the furnace company. The court held that the purchase had been made by the fraudulent representation that the Premier Company were sound and free of incumbrances, when in reality they carried a \$50,000 mortgage and were about to put on a further mortgage for \$300,000. He ordered the receiver to turn over the pig iron to the Chicago company, but denied the latter's petition for \$25,000 damages and that they be made a preferred creditor to the extent of \$10,000.

Sarah Furnace, owned and operated by the Kelly Nail & Iron Company, has recently been making an excellent record for production of Bessemer iron. The entire output of this furnace is used in the Bessemer steel plant of the Ashland Steel Company, Ashland, Ky., of which concern the Kelly Nail & Iron Company are an identified interest.

On Monday, the 5th inst., a general reduction of 10 per cent. in wages of the employees and officials of the Belfont Iron Works Company, at Ironton, Ohio, went into effect. The reduction was accepted by all the employees except the nipper boys, who refused to accede to the reduction and quit work. Their places were promptly filled with new hands.

The Brown, Bonnell Iron Company of Youngstown, Ohio, are at present erecting some new boilers which will be fired direct, the object being to make steam sufficient to run their finishing mills independently of the puddling mills. This firm now depend largely on boilers in their puddling mills for steam for their finishing mills. The boilers now being erected were formerly used at Falcon Furnace of this concern, which was dismantled a month ago.

The condition of affairs at the Troy, N. Y., Steel & Iron Works remains about the same, and the prospect for resuming work on a larger scale is not promising. The plant is being run on orders, which are very few. Only the merchant mill and a few minor departments are now running.

At the Albany Iron Works, Troy, N. Y., last week the forging hammer in the water mill resumed work after an idleness of three weeks. In the steam mill the 14 inch train is running.

The employees of the Blandon Rolling Mill Company, at Reading, Pa., have been notified of a reduction of 10 per cent. in wages.

The Canonsburg Iron & Steel Company of Canonsburg, Pa., contemplate the erection of two additions to their plant, which will cost about \$25,000.

The chemical laboratory of the Bethlehem Iron Company, at South Bethlehem, Pa., has been burned, entailing a loss of \$5000. The building will be rebuilt at once. The most important records and re-

ports, as well as the majority of the delicate instruments, were saved.

The employees of the Pennsylvania Bolt & Nut Company of Lebanon, Pa., have been placed on longer time.

It is reported from Clarksville, Tenn., that the old Bear Spring charcoal furnace in Stewart County will resume in a few days. The furnace was built in 1832, abandoned in 1854 and rebuilt in 1873. It has been idle for a good many years.

The Sewanee Furnace of the Tennessee Coal, Iron & Railroad Company, situated at Cowan, Tenn., has blown in. The furnace had been idle since November, 1893. Many improvements have been made, and it is expected that the capacity will be nearly double what it was before the alterations were made.

John Morris of the Trinidad, Col., Iron & Steel Company, is said to be looking over the iron deposits of Western Washington with a view of locating a blast furnace plant on the Sound.

At a meeting of the American Tube & Iron Company, Middletown, Pa., these officers were elected: Colonel James Young, president; George Matheson, vice-president; A. S. Matheson, general manager; F. Musselman, secretary and treasurer; James H. Matheson, superintendent; James Young, George Matheson, John J. Showers, A. S. Matheson, A. W. Momeyer, directors. The company have just received an order for \$175,000 worth of natural gas pipes from Ontario. Half the plant is in operation, with 750 hands at work.

Col. A. L. Conger of Akron has sold his interest in the American Tin Plate Company to W. B. Leeds and will at once invest in another industry of similar character at the same place, assisted by English capital. A few weeks ago I. L. Morris, formerly of Hammond, Ind., organized a company to make tin plate at Elwood and another company of Chicago capitalists are making arrangements to build a large plant. This will make four tin plate concerns in Elwood, and if each project is carried out the total output will be about 16,000 boxes per week.

It is now reported that the sheet mills of the Ellwood Steel Company, Ellwood, Pa., will not be moved to Cambridge, Ohio, to be added to the plant of the Cambridge Iron & Steel Company. The citizens of Cambridge made an effort to raise a bonus for the purpose, but the proceedings came to a sudden stop when it was announced that Ellwood parties had threatened to institute proceedings to enjoin the proprietors from moving the plant away from Ellwood. As a compensation for the disappointment Cambridge is promised a tin plate plant in the near future. The Cambridge mills have been operated steadily during the crisis in trade and finance.

We are advised that the Aetna-Standard Iron & Steel Company, Bridgeport, Ohio, are perfecting arrangements with the intention of engaging in the manufacture of tin andterne plate. Further particulars regarding the new departure of this concern will be forthcoming in a short time.

The Anniston Pipe Works, at Anniston, Ala., which shut down about six months ago, are being started up by a new company who recently purchased the plant.

The Delaware Rolling Mills, at Phillipsburg, N. J., have started up six furnaces. The works have not been in operation since last spring.

The 275 employees of the Syracuse Tube Works, Syracuse, N. Y., refused to work at a 10 per cent. reduction.

The Valley Steel Works, at Belleville, Ill., have shut down after a ten-days' run. It is not definitely known when work will be resumed.

The Bessemer department of the Troy Steel & Iron Company, at Troy, will soon be started. Among others an order for 4000 tons of billets was recently booked.

The State of Texas, which owns and operates the Old Alcalde Furnace, at Rusk, Texas, is considering the advisability of adding a rolling mill to the furnace plant.

The property of the Keystone Iron Works Company, at Kansas City, Mo., has been sold by the receiver at public auction to Latthrop B. Bullene for \$37,500, cash. The sale will not in the least affect the operation of the works, which will continue in full operation. The works were closed by an attachment in November, 1891. A receiver was appointed, and after an idleness of two weeks the plant was put in operation and has continued to run ever since. The

plant, which is practically a new one, is valued at \$125,000. At present over 100 hands are employed.

Machinery.

Work on the new plant of the Westinghouse Electric & Mfg. Company, at Brinton, Pa., on the line of the Pennsylvania Railroad, about 12 miles from Pittsburgh, was commenced last week. All the contracts for the construction of the plant have been awarded the greater part of the structural material, being taken by the Carnegie interests, at Pittsburgh. At present work will be begun on but two of the buildings, the warehouse and machine shop, and on these two structures about \$500,000 will be expended. Under this head comes masonry, iron and steel construction, wood work, roofing, painting and the putting into place of the cranes. For each of these classes of work separate contracts have been made. The quantity of undressed lumber used will be very large. An idea of the requirements may be gotten from the fact that the joists will be 12 inches deep and 2½ inches thick and will be laid side by side to form the flooring. The work will be pushed forward as rapidly as possible and will give employment to a very large force of men.

The William Grover Tank Works, at East Chicago, Ind., are getting into operation again after a rest of nearly six months. When running full they give employment to 200 men, most of whom are skilled mechanics.

The Ticonderoga, N. Y., Machine Company are flourishing, with 42 men in their employ. They have recently shipped five pulp screens to the Barclay Fiber Company, Saugerties, N. Y., and are about to ship an 80-horse-power engine to Mexico for the Western Electrical Company; also two 500 horse-power condensers. They have a contract and are at work on ten embossing presses for the Johnston Embossing Machine Company, New York City.

The plant of the Chattanooga Tool Company, at Chattanooga, Tenn., which has been idle for over three years, has been purchased by a stock company, who will place it in operation at once.

The employees of the Atlantic Works, at Boston, Mass., have been notified that hereafter the works will be run on the hour system. The works have been running on the nine-hour system, paying the same wages as formerly paid for ten hours' work. The men look upon the change as a 10 per cent. reduction.

Warren Webster & Co. of Camden, N. J. are sending out *fac-similes* of the report made by Geo. H. Barrus, C.E., of Boston, upon the tests of the Webster steam and oil separators in use in the power house at the World's Fair. The steam separator test proved that 17½ per cent. of moisture was handled by the separator and intercepted, the quantity covering all the moisture introduced. In the oil separator test the results were very gratifying to the makers of the separator. A pint of oil weighing 15 ounces was introduced into the oil cup and the whole quantity was discharged into the pump cylinder. Of this there was withdrawn from the separator, after drying, 13 ounces, or 86.7 per cent. of the whole quantity. The oil was fed at the rate of from 10 to 14 drops per minute. The report describes the conditions of the tests and embodies a plan of the testing apparatus.

S. Norris Craven & Co., Ltd., is the name of a new concern recently established at 515 Mulberry street, Philadelphia, for the manufacture and building of electric, hydraulic, belt and hand power elevators. Their building is 148 x 20, and contains two floors, and a loft 50 x 20. Their machine shop and office occupies the first floor, the second floor is devoted to the wood working shop, while the loft will be used for storing patterns. The shop is well equipped with the latest and most improved machinery, and the venture should prove a successful one.

J. F. Seiberling & Co., Akron, Ohio, manufacturers of Empire harvesting machinery, have recently started up their foundry full force, while all the other departments are working with a reduced force. This firm expect within three weeks to have their plant in full operation.

Among recently authorized corporations in Illinois are the following: Sharpneck Mfg. Company, Chicago; capital stock, \$100,000; to manufacture oil burners, pumps, &c.; incorporators, Eli Sharpneck, George F. Smith, William A. Saunders. Western Wire Company, Chicago; capital stock,

\$300,000; incorporators, S. L. Mersten, J. T. Nickerson, H. D. Ames, William Moseback and John Tyler. The Smith-Hill Foundry & Machine Company, at Quincy, have certified to change of name to Smith-Hill Elevator Company.

The Ball Engine Company of Erie, Pa., have made a number of installations in connection with various types of dynamos; among late ones two 200 horse-power cross compound engines, directly connected to Siemens & Halske dynamos in the Lumber Exchange Building, Minneapolis, Minn.; one 125 horse-power simple engine, in connection with Waddell-Entz dynamo, in the store building of Willoughby, Hill & Co., Chicago; one 30 horse-power engine, in connection with Waddell-Entz dynamo, in the building of Cumner, Craig & Co., Boston, Mass.

The Union Foundry & Stove Works, at Frederick, Md., have been destroyed by fire. The loss is estimated at \$15,000; insured for \$3400.

The Avondale machine shop and car sheds, at Cincinnati, Ohio, have been burned. The loss on the former was \$25,000.

The following new concerns have been chartered under the laws of New York: Lewis Tool Company of New York; capital, \$20,000; directors, Mortimer G. Lewis, Edwin H. Mulford, New York City; John R. Mulford, Havana. Sterling Supply & Mfg. Company, New York; to manufacture and sell supplies for steam, electric, cable and horse railroads, &c.; capital, \$15,000; directors, William D. Baldwin, William H. White and Job R. Furman, New York.

Hardware.

The Maddox Wire Netting Company, Cooperstown, N. Y., have been incorporated. The directors of the company are James F. Clark, John J. Doane, Albert Lane and others.

Irving H. Page has resigned the office of secretary of the J. Stevens Arms & Tool Company, Chicopee, Mass., and has accepted a position with L. S. Starrett, Athol, Mr. Page had been connected with the company for more than 14 years.

The McFarland Mfg. Company have been organized at Portland, Maine, with an authorized capital of \$100,000. The company will manufacture a line of hardware. Robt. D. McFarland is president of the company and C. F. McFarland treasurer.

The plant of Wickwire Bros., Cortland, N. Y., is running night and day in order to keep up with orders.

The Robinson Chilled Plow Company, Canandaigua, N. Y., have been incorporated, with a capital of \$20,000. Edson C. Robinson, John B. Hall and Alexander Robinson of Canandaigua are directors.

A press dispatch from Anderson, Ind., states that the Wright Shovel Company of that place have received an order for 160 dozen extra heavy spades to be used by the Brazilian government troops in throwing up fortifications. The order was at once sent to the shops to be rushed through.

The Sandusky Tool Company of Sandusky, Ohio, manufacturers of hand planes, have purchased the wood on 80 acres of land near Bucyrus. It will require over a year of very active work to cut the timber. The wood, which is principally beech and maple, will be cut into 32-inch blocks on the ground.

The Champion Drill Works, at Avon, N. Y., are again in operation after being shut down since August.

The Essex Horse Nail Company of Essex County, N. Y., have reduced wages 10 per cent.

The general depression in business has affected to a considerable extent the sale of sewing machines, and as a consequence foundries that have been engaged largely in the manufacture of sewing machine castings have turned their attention in part to other work requiring a similar grade of iron. A considerable proportion of the business of the Palmers & DeMooy Foundry Company of Cleveland has for several years consisted of sewing machine castings, and up to the beginning of the depression last summer their facilities were taxed to the utmost in turning out this class of castings, as well as hardware specialties and novelties of various kinds in gray iron. This company have one of the largest foundries in the country for the production of light castings, and when running to full capacity employ over 300 men.

The plant of Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., was partially destroyed by fire on the 11th inst.,

involving a loss of nearly \$250,000. The building in which the fire, originated was of stone and brick, three stories high and nearly 400 feet long, connecting the east and west armories. The fire through the energetic efforts of the firemen, was mostly confined to this building. It is thought that the insurance will foot up \$200,000. Five hundred hands have been thrown out of work, but if the boilers are intact, as it is believed they are, the shops will be running in a week.

The implement works of E. Bement & Sons, Lansing, Mich., were damaged by fire on the 10th inst. The loss is estimated at \$5000.

The Lakeside Nail Company will start up their works, at Hammond, Ind., provided the men will sign a new scale, said to be 15 to 25 per cent. lower than the old one.

The P. & F. Corbin Company of New Britain, Conn., will erect a new foundry in the spring.

The Baackes Wire Nail Company, Cleveland, Ohio, which concern went into the hands of a receiver last summer, have secured sufficient money from their stockholders to pay their indebtedness in full. The payments will be made in a short time, and will be on the basis of 33½ per cent. cash, the balance in five-year bonds, bearing 6 per cent. interest.

Miscellaneous.

Business at Racine, Wis., is reviving. The J. I. Case Threshing Machine Company, whose works have been closed five months, are to resume with the full force of 600 men on the 19th inst. The Mitchell & Lewis wagon factory, employing 500 men, has started up within the past week.

The McNeal & Urban Safe and Lock Company's property, at Hamilton, Ohio, has been sold at auction to Henry Harninghouse, a safe maker at Cincinnati. He paid \$30,500 for property appraised at \$112,850. The works may resume operations in a short time.

The Wrought Iron Bridge Company, manufacturers of metallic structures and highway bridges, closed a contract last week for the erection of the Sheridan street bridge in Milvale Borough, Bennett, Pa.

The Edison Electric Works, at Schenectady, N. Y., have resumed operations with a slightly increased force. Additional employees will be put at work as soon as possible, and it is said that in a few weeks the shops will be running with a force of 4000 or 5000 persons. The company have received several large orders.

The New Jersey Copper Extraction Works, at Elizabethport, N. J., which suspended some weeks ago, have resumed operations.

The Graham Equipment Company, organized and chartered January 13 under the laws of Rhode Island, will erect a plant at Providence, R. I., for the manufacture of the Graham truck for street railway cars. The capital stock is \$100,000.

The reopening of Henry Piepgras' shipyard at City Island, N. Y., which has been closed for a year, will give employment to 500 men.

The employees of the St. Louis, Mo., Stamping Company have been subjected to a cut in wages, amounting to 10 to 15 per cent.

The car works of John M. Jones, at West Troy, N. Y., have shut down for an indefinite period. When the works are running on full time between 300 and 400 men are employed.

A. C. Jessop, whose office is at Fuller Bros. & Co., 139 Greenwich street, announces that he has severed his connection with the American Sheet Iron Company of Phillipsburg, N. J., and will in the future act as the agent for New York City, the Middle and Eastern States of J. Wood & Bros. Company, Conshohocken, Pa., who have an annual output of 25,000 tons.

The United States Projectile Company of Brooklyn announce that they have withdrawn the agency for the sale of Steel Tubing from the Anglo-American Iron & Metal Company, their intention being to handle all their products hereafter direct from the works.

The Iron and Metal Trades.

Taken all together the news of the week may be summarized as being encouraging in a modest way. The volume of business is increasing, but the fact that prices in many lines are lower than ever shows conclusively that there are only too many mills desperately hungry for work.

It is announced that the management of the Norrie Mine of the Gogebic range, which has a record of nearly 1,000,000 tons product in one year, is offering and has sold its Bessemer Ore for this season's delivery at \$2.75. It is stated that this is a few cents above the actual cost of laying the Ore down at Cleveland. The fact is interesting as showing that the largest mine of the Gogebic range and the one mining most cheaply is down to bed rock in the price. Coke is selling at Connellsville oven at 85¢ \pounds net ton, the lowest on record. All this means low cost for the districts using Lake Ore and Connellsville Coke as raw materials.

The flurry in Billets is over. It is stated that \$16 can be slightly shaded in Pittsburgh, while in the East the market is decidedly easier. It is surmised that this falling back in Eastern Pennsylvania is due to the fact that special rates of freight are being secured. It is now known that a \$2 rate from Pittsburgh to points east of Harrisburg to Philadelphia has been done.

Along the whole line of rolling mill products, with the exception of Wire, the tremendous competition continues and lower prices have been made than ever before. Rumors are being circulated that the most conspicuous of the Pittsburgh mills is withdrawing, but the happenings in the markets do not bear out that statement. Quite a number of contracts for structural and bridge work have been let and a number of moderate lots of Plates have been placed, but the prices at which a good deal of this work went are lower than any recorded. Plates have sold down to 1.25¢, delivered at tidewater, and there has been some lively cutting on Beams. Iron Bars in Chicago are being quoted 1.15¢, delivered, while Skelp in Eastern Pennsylvania has sold down to 1¢ \pounds lb at mill.

From the leading cities of the country come reports that architects' offices are full of work, but as yet relatively little of the known large aggregate tonnage has reached the Architectural Iron works.

The situation in Foundry Pig is somewhat peculiar. Low Lake Ore and Connellsville Coke is enabling Western furnaces to crowd back the Southern producers from the Central Western markets and resales of Southern Pig from second hands at less than \$6 50, Birmingham, for No. 4 Foundry (Gray Forge) are giving the primary markets for Southern Iron an appearance of weakness.

In New England, however, there have cropped up during the last week many evidences of a desire to contract far ahead. The majority of the largest transactions there have been captured at low prices by Virginia furnaces.

If something final were only done in Washington at once, the feeling would improve. Unfortunately, the low price of wheat, diminishing as it does the purchasing power of the farmers, is looming up as a new disturbing factor.

Chicago.

(By Telegraph.)

Office of The Iron Age, 58 Dearborn street, CHICAGO, February 14, 1894.

Business generally is in still better shape than reported last week. The improvement has taken in some additional branches and there are now very few in which the impulse to at least a larger volume is not plainly apparent.

Pig Iron.—The volume of business in local Coke is of good proportions, but no specially large transactions have taken place the past week. The market for such Iron, however, is widening, and inquiries are being received from localities in which Southern has for several years held undisputed sway. Our quotations on local Coke are based on small quantities, which at present constitute the great majority of transactions, but orders of some size are placed on an independent basis, on which the price is the subject of negotiations and consequently may be considerably lower. Only small orders are reported by sellers of Southern Coke. Lake Superior Charcoal continues quiet. Quotations are given as follows, for cash:

Lake Superior Charcoal.....	\$15.30 @	\$15.50
Local Coke Foundry, No. 1....	12.50 @	13.00
Local Coke Foundry, No. 2....	12.00 @	12.50
Local Coke Foundry, No. 3....	11.75 @	12.00
Local Scotch.....	13.00 @	13.50
Ohio Strong Softeners No. 1....	15.00 @	15.50
Southern Silvery, No. 1.....	13.00 @	13.75
Southern Silvery, No. 2.....	13.00 @	13.25
Southern Coke, No. 2.....	11.50 @	11.65
Southern Coke, No. 3.....	11.00 @	11.50
Southern, No. 1, Soft.....	11.50 @	11.65
Southern, No. 2, Soft.....	11.00 @	11.50
Tennessee Charcoal, No. 1....	16.00 @	16.50
Tennessee Charcoal, No. 2....	15.00 @	15.00
Southern Gray Forge.....	10.60 @	10.85
Alabama Car Wheel.....	18.00 @	18.50
Jackson County Silvery.....	16.00 @	16.50
Other Ohio Silvery.....	15.00 @	15.50

Bars.—No large transactions are reported, but the starting up of numerous manufacturing consumers is expected to cause an increased volume of business at an early day. Inquiries are now coming in which foreshadow the improvement. Competition during the week has been so sharp that prices have been reduced lower than ever and quotations on Bar Iron are now made at 1.15¢ @ 1.25¢, half extras, Chicago. Steel seems to be in somewhat better demand than Iron and is quoted at 1.35¢ @ 1.40¢ for best brands. Evidences are coming up of the belief of large manufacturing consumers that the bottom has about been reached. A very large Agricultural concern will place a season contract the latter part of this month for the coming year, which is much earlier than usual. Jobbers report only a moderate demand from store, with small lots of Bar Iron quoted at 1.40¢ @ 1.50¢, and Steel at 1.50¢ @ 1.60¢.

Structural Material.—The bridge builders are doing more work, but it is on small orders, to which much more attention is paid than in ordinary times. Building projects are coming into sight, but are not taking shape very rapidly. Quotations at present are as follows for Chicago delivery: Beams and Channels, 1.45¢ @ 1.50¢; Tees, 1.75¢ @ 1.80¢; Angles, 1.35¢ @ 1.45¢; Universal Plates, 1.40¢ @ 1.50¢. Small lots from stock are sold at an advance of 10¢ @ 15¢ \pounds 100 above these prices.

Plates.—An improving demand in mill orders is reported by manufacturers' agents, who assert that better prices might now be secured if some of the largest makers would cease hammering the market. Dealers are also experiencing a better demand from stock. The prospects in this direction are con-

siderably brighter than they have been, as a great deal of work is in sight for which material must soon be bought. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.40¢ @ 1.50¢; Flange Steel, 1.80¢ @ 1.90¢; Fire Box, 2¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 2¢ @ 2.10¢; Tank Steel, 1.90¢ @ 2¢; Flange Steel, 2.20¢ @ 2.45¢; Boiler Tubes, 70 and 5¢ off.

Sheets.—Black Sheets have latterly been in such good demand that mills are now beginning to report themselves sold up for at least 30 days ahead. An unusual call has lately been made for Stove Pipe Iron, the demand for which ordinarily comes much later in the year. Quotations on mill shipments of No. 27 Common are 2.55¢ @ 2.60¢, Chicago, while small lots from stock are quoted at 2.75¢ @ 2.80¢. The demand for Galvanized Iron has been so much better of late that manufacturers have in some cases refused to accept more orders at current prices and withdrawn from the market. The bottom quotation on mill shipments of Juniata now appears to be 75 and 10%, while small lots from stock are still sold at 75¢ off. Sheet Copper is quoted at 30¢ @ 35¢ off for Light Sheets, and up to 40¢ off for Heavy Sheets, according to quantity.

Merchant Steel.—Small orders for immediate delivery are becoming more numerous, while specifications on season contracts are being received at a lively rate. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery, Tire and Open Hearth Spring Steel, 1.85¢ @ 1.95¢; Ordinary Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Billets and Rods.—Continued large transactions are reported in Billets, and additional sales could have been made if local manufacturers were in shape to promise early delivery. There is a possibility that the conditions prevailing will compel further manufacturing facilities to be provided soon for the production of Billets at the Joliet Works, which are now sold up to July 1. The price is now firm at \$18.50. Inquiries continue to be received here for Wire Rods, but much difficulty is experienced in placing orders. The Washburn & Moen Company are operating their Waukegan Rod Mill single turn, but if the demand for Rods continues they will be obliged to put it on double turn. Quotations on Wire Rods are continued at \$25.

Rails and Track Supplies.—The Steel Rail situation is not so buoyant as the Steel trade in other lines, but the manner in which inquiries are now being received indicate an active business at an early day. Arrangements have not yet been made for starting up the South Works, which shows that the orders received thus far have not warranted the resumption of Rail production on any considerable scale. Quotations are repeated at \$25 @ \$27, according to quantity. Splice Bars are unchanged at 1.40¢; Track Bolts with Hexagon Nuts, 2.45¢ @ 2.50¢, and Spikes, 1.80¢ @ 1.85¢.

Old Rails and Car Wheels.—Some negotiations have been in progress for Old Iron Rails, but buyers and sellers have been too far apart in their views to come to terms. Offers of \$11.50 @ \$11.75 have been made and refused by railroad companies, who seem to expect to get \$12 @ \$13. Long lengths of

Old Steel Rails are quotable at \$9.50 @ \$10, while short pieces would perhaps bring \$6.75. Old Car Wheels are quiet, with nominal quotations \$10.50 @ \$11.

Scrap.—Quite a business has been transacted by the railroads in the sale of Scrap during the week, and they claim that they have realized about 10% better prices from both dealers and consumers than last month. It is stated that some dealers have paid as high as \$10 for No. 1 Forge. The shrewdest dealers are not taking much stock in the apparent stiffening of prices and are not disposed to buy. Consumers insist that they are able to secure Wrought Scrap at as low prices as at any time in the past two months. Under the circumstances, it seems unnecessary to change quotations on No. 1 Forge—namely, \$8.50 @ \$9. Heavy Cast has declined to \$7.75. Dealers quote Splice Bars at \$12.50, but consumers say that they have recently bought at considerably under that price. Mixed Steel is nominally quotable at \$5.25.

Metals.—Carload lots of Lake Copper are unchanged at 10¢, but casting Copper is a little weaker and quotations are 9½¢ @ 9¾¢. Spelter is moving upward, through an agreement among the producers as well as an increased demand from consumers, and is now quoted at 3.60¢ @ 3.65¢, with but little metal offered by the makers. Pig Lead is again weaker and quoted at 3.10¢.

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, February 14, 1894.

Pig Iron.—There is no improvement to note either in price or demand. Some furnaces refuse to meet the low prices at present prevailing, but they are so much in the minority that their refusal fails to strengthen the market. No. 2 Foundry is reported to be sold at less than \$7.50, f.o.b. cars Birmingham. While buyers seem to realize that present prices are low they refuse to buy largely. The result is that a strictly hand to mouth business is being carried on. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	dry	.....	\$12.00 @ \$12.25
Southern Coke, No. 2 Foundry	dry	.....	11.00 @ 11.25
Southern Coke, No. 3 Foundry	dry	.....	10.50 @ 10.75
Southern Gray Forge	.....	.....	10.00 @ 11.25
Southern Car Wheel	.....	.....	17.00 @ 18.00
Lake Superior Car Wheel	.....	.....	16.50 @ 17.00
Ohio Softeners	.....	.....	1.75 @ 16.25

Bar Iron.—The demand for Bar Iron fails to show any improvement and prices are equally unsatisfactory. Mills quote 1.25¢, f.o.b. cars East St. Louis, which now appears to be as low as they will go. Jobbers ask 1.50¢ for small lots from store.

Barb Wire.—The improved condition of the Barb Wire market noted in our last report continues and mills report a steadily increasing demand. The freight rate to Texas points on Barb Wire and Wire Nails has been reduced from 50¢ to 31¢, which rate went into effect on the 10th inst. A heavy trade from Texas is anticipated as the result of this cut. Jobbers find it difficult to procure prompt shipments, as mills have all they can handle. Prices are firmly maintained as follows: Painted

from mill \$2.05. Carload lots, 5¢ hundredweight less than above prices.

Wire Nails.—There is not much improvement to note in this department. The price of \$1.10 made by a local house has been withdrawn and \$1.15 substituted. Mills quote \$1.20 @ \$1.25 in carload lots. Jobbers ask \$1.30 @ \$1.35, according to quantity.

Rails and Track Supplies.—There is no change to report either for better or worse. There are very few orders being placed for Railway Supplies, and prices show considerable weakness. We quote as follows: Splice Bars, 1.45¢ @ 1.50¢; Spikes, 1.80¢ @ 1.85¢; Bolts, Square Nuts, 2.25¢; with Hexagon Nuts, 2.35¢; Links and Pins, 1.80¢ @ 1.85¢; Old Iron Rails, nominally \$13; Steel Rails, \$26 @ \$27, according to quantity.

Pig Lead.—This metal is dull at 3.05¢. A sale of two cars yesterday at 3.07½¢ and three cars to-day at 3.05¢ indicates the dull condition of the market.

Spelter.—The upward movement noted in our last report has gained additional headway, and sellers are now holding firm at 3.65¢. Bids of 3.60¢ do not result in any business. The movement is purely speculative, and unless a strong demand sets in a downward shoot in prices would not be surprising. Those manipulating the market, however, appear to have it in control, and may perhaps be able to advance prices to a 4¢ basis. Sales are limited to carload lots.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fifth and Main Sts.,
CINCINNATI, February 14, 1894

While the volume of business in Pig Iron has been small in this market during the week, yet there have been some moderate lots sold elsewhere in this district and at a lower price for Foundry and Forge Iron, which sets the pace for the trade, although it is claimed that the low prices that were made were exceptional and would not again be accepted, but this is an old dodge and is not given much credence by the trade, for it has long been known that concessions would have to be made to induce buyers to take hold, and the only question was how much. Southern Irons are about 25¢ per ton lower than they have before been quoted, and while there have been no transactions in Mottled Coke on which to base quotations it is presumed it would not sell for as much as Gray Forge, but yet it is comparatively scarce and the same price might have to be paid. We give revised quotations for some grades of Northern Iron, but there is not much doing on them, and Charcoal Iron is very quiet. Quotations are merely nominal, as follows:

Foundry.

Southern Coke, No. 1	.....	\$11.25 @ \$11.50
Southern Coke, No. 2	.....	10.25 @ 10.50
Southern Coke, No. 3	.....	9.75 @ 10.00
Ohio Soft Stone Coal, No. 1	.....	14.50 @ 15.50
Ohio Soft Stone Coal, No. 2	.....	14.25 @ 14.50
Lake Superior Coke, No. 1	.....	13.00 @ 13.50
Lake Superior Coke, No. 2	.....	12.00 @ 12.25
Hanging Rock Charcoal, No. 1	.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 2	.....	16.50 @ 17.00
Tennessee Charcoal, No. 1	.....	13.50 @ 14.00
Tennessee Charcoal, No. 2	.....	12.50 @ 13.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	.....	16.75 @ 17.75
Lake Superior Car Wheel and Malleable	.....	16.50 @ 17.00

Forge.

Gray Forge	.....	9.25 @ 9.50
Mottled Coke	.....	9.25 @ 9.50

Philadelphia.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, Pa., February 13, 1894.

The market has not changed to any appreciable extent, although there are some faint indications of weakening in Steel Billets, but apart from that the feeling favors improvement. There is a good deal of business doing, and prices are pretty steady, but no progress has been made toward a further advance. The outlook is not materially different to what it was a week ago, and for the present manufacturers are satisfied with the improved demand without attempting anything in the way of better prices, which with the exception of Billets remain at the lowest ever quoted. The very serious decline in the grain market has had a depressing influence, the idea being that with wheat at lower prices than were ever recorded farmers cannot have much money to spare, and that in consequence there is little to hope for from that source. This feeling is in a measure reflected in the securities of the wheat carrying roads, as well as the trunk lines, all of which show a declining tendency.

Pig Iron.—All that can be said is that sales are made with less difficulty, and that prices are maintained. Options that were given last month have nearly all been accepted, and while makers have not arrived at a point at which they refuse business at the old quotations, they are just as well satisfied to accept small orders for prompt delivery as large orders for long delivery. The supply is not excessive, but consumers find the demand for their products so unsatisfactory that they have no disposition to place large orders for material, although conceding that it is hardly possible for prices to be lower than they are to-day. It is not easy to give exact quotations, but in general terms \$11 @ \$11.50, delivered, is about an average for good No. 3, \$12.50 @ \$12.75 for No. 2x, and \$13 @ \$13.50 for No. 1x. Some brands bring a little more, some can be had for a little less, all depends on the circumstances governing each particular transaction. At interior points, such as Harrisburg and York, lower figures prevail, the range for all deliveries at seaboard being about as follows:

No. 1 Foundry	.....	\$13.00 @ \$13.50
No. 2 Foundry	.....	12.50 @ 13.00
Standard Gray Forge	.....	11.25 @ 11.50
Ordinary Gray Forge	.....	10.75 @ 11.00

Steel Billets.—The market is a little easier, it may be because of special rates of freight, or for other reasons, but orders can be placed at \$18, delivered, which is 25¢ @ 50¢ less than was asked a week ago. With indications of weakness on the part of sellers, buyers are less inclined to do business, so that it looks as though another period of dullness may be met with, unless an actual increase in consumption forces buyers into the market. Everything depends on consumption, so that the next few days will show whether the recent activity was speculative or due to actually improved conditions. Various reasons are given for the lower figures, one being that buyers who had been negotiating on the basis of \$17.50 were aggrieved at being left out, and that sales at \$18 were a compromise from \$18.50. Others say that special rates of freight have been made at certain points, but whatever the cause it is evident that prices to-day are not as strong as they were a week ago, while buyers are less determined than ever not to place orders in advance of re-

quirements, until the situation is less obscure than it is to-day.

Finished Material.—The demand shows further improvement without being at all active, or without any very clear indications that it is likely to become so in the near future. Manufacturers are getting more orders and are gradually increasing time in their mills, which is very encouraging so long as it continues. There is no reason to expect any setback so far as any one can see; the only bad feature is the extraordinary competition for every order of a few hundred tons and from that upward. It is safely within bounds to say that less than 1.25¢, delivered, has been done on Plate orders, and at 1.30¢ it would include high test Plates. Skelp has been done at about 1¢ $\frac{1}{2}$ lb at mill, and Bars very little over that, but all depends upon how much is wanted and the kind of competition there is to get the order. Small lots are quoted about as follows, with a very fair demand:

Grooved Skelp, delivered.	1.30¢	@ 1.35¢
Best Refined Bars.....	1.35¢	@ 1.40¢
At interior points.....	1.20¢	@ 1.25¢
Tank Steel.....	1.35¢	@ 1.40¢
Heavy Plates.....	1.40¢	@ 1.50¢
Shell.....	1.50¢	@ 1.60¢
Flange.....	1.70¢	@ 1.90¢
Angles.....	1.50¢	@ 1.60¢
Beams and Channels.....	1.60¢	@ 1.80¢

Old Material.—The demand is a little better, but prices have as yet failed to respond to the improved conditions. Steel Scrap is wanted, but extremely low prices are bid, asking prices being about as follows, delivered:

Heavy Melting Steel.....	\$10.00	@ \$11.00
Light Melting Steel.....	8.00	@ 9.00
No. 1 Wrought Scrap.....	10.50	@ 11.50
Machinery Cast.....	9.50	@ 10.50
Wrought Turnings.....	9.00	@ 10.00
Cast Borings.....	6.00	@ 6.50
Old Iron Rails.....	12.50	@ 13.00

Pittsburgh.

(By Mail.)

Office of The Iron Age, Hamilton Building,
PITTSBURGH, February 13, 1894.

The second week in February did not witness any material change in the Iron and Steel trades. The improvement in inquiries which commenced during the latter part of January continues, and the outlook for a heavier volume of business right along is extremely encouraging. One encouraging feature of the situation just now lies in the fact that buyers in many cases are buying in larger quantities than they have for some months. This would indicate that the belief exists that prices are at such a point that it is safe to anticipate wants to some extent, and further, that the demand from the retail trade warrants heavier purchases being made. Considerable business recently booked, especially in Structural Material, is work that has been held over from last year, and this demand, in connection with the regular season requirements, will undoubtedly result in a heavy tonnage being called for in the next few months. Perhaps the most depressed product at this time, both as regards demand and prices, is Coke. For some time a vigorous warfare has been going on among the Connellsville operators with the result that Coke has been freely offered for some time at 85¢ @ 90¢ $\frac{1}{2}$ ton, with the demand extremely light. It is claimed that Coke cannot be sold at the above prices and a profit realized, even by the most favored producers. To the smaller operators transactions at the above

prices probably mean a loss. An item of interest to note at this time is the fact that the Washington Coal & Coke Company, through N. P. Hyndman, their Pittsburgh representative, have just closed a contract with the Grand Trunk Railway of Canada for 50,000 tons of coal to be delivered during this year. Reliable advices are that some business has been done in Ore, several contracts for this year's delivery being closed in the last few days. Prices on Bessemer Ore of standard grade are said to be fully \$1 $\frac{1}{2}$ ton lower than last year, the transactions referred to above being on the basis of \$3.75, Cleveland.

Pig Iron.—Several fair sized lots of Bessemer are under negotiation, and are expected to be closed within the next few days. The better feeling in Soft Steel has been communicated to the Pig Iron market, and some of the makers are not disposed to let go of their product at this time at prices which would have been accepted without a murmur a few weeks ago. The Valley makers are disposed to regard \$10 at furnace as their minimum price, equal to \$10.65, Pittsburgh. More inquiries for Gray Forge are in the market than for some time, and sales made two weeks ago at extremely low prices could not be duplicated to-day. The demand for Foundry Iron is light and prices show no inclination to improve. Taken as a whole, the Pig Iron market is better than it was a month ago, but there remains plenty of room for further improvement. We repeat former quotations, as follows:

Neutral Gray Forge.....	\$9.75	@ \$10.00 cash.
All-Ore Mill.....	9.75	@ 10.00 "
No. 1 Foundry.....	11.75	@ 12.00 "
No. 2 Foundry.....	10.75	@ 11.00 "
Bessemer.....	10.65	@ 10.75 "

We note a sale of 3000 tons of Bessemer, equal deliveries in February and March, at \$10.65, delivered. Also 1000 tons of Gray Forge, same deliveries, at \$9.65, Pittsburgh, and a sale of 200 tons of No. 2 Foundry at a price equal to about \$11, delivered.

Ferromanganese.—Sales of 80 %, domestic, have recently been made at \$52, delivered, the open freight rate being 75¢, equal to \$51.25 at maker's mill.

Billets.—The market holds its own as far as prices are concerned, but sales last week, compared with the previous week, show a marked falling off. However, this was to be expected, as the market had so long been in buyers' favor that when the advance came and sellers had set their mark at \$16, below which they would not go, buyers were nonplussed for a time, and even yet are not prepared to believe that Steel can no longer be had at a shade under \$15.50. The fact is worthy of note that most of the mills are well fixed with business, most of it taken before the advance came, and are therefore in position to maintain the stand they have taken. One of the largest makers in this section is credited with being sold up to July 1. The market is represented by the quotation of \$16 at mill. We are advised of sales during the week amounting to some 8000 or 10,000 tons, while reports are going of a block of 5000 tons changing hands for Eastern shipment, the deliveries running up to the middle of the year.

Structural Material.—Pittsburgh has taken the order for the Milwaukee viaduct, amounting to some 2500 tons. A good deal of Eastern work has also been taken here, and in connection with

other business in negotiation, the outlook for the future is favorable. It is the impression that prices cannot well go lower. Beams at 1.20¢, Pittsburgh, are certainly close to cost, if not below it. In some quarters it is the impression that better prices will rule within the next 60 days. We quote as follows: Beams and Channels up to 15 inches, 1.25¢ @ 1.35¢, according to order; Angles and Universal Plates, 1.25¢ @ 1.30¢; Tees, 1.40¢ @ 1.50¢.

Plates.—In addition to the order for 600 tons of Tank Plate, taken by Pittsburgh for Western delivery, as noted last week, some additional business for Eastern markets has been closed within the last week, and it is safe to say that the makers have more business on their books now than at any time within the last three or four months. The tone of the market has slightly improved and predictions are made that prices will not go any lower, but may recover to some extent before long. Prices for ordinary business are ruling as follows: Tank Steel, 1.25¢ @ 1.30¢; Shell, 1.40¢ @ 1.50¢; Flange, 1.50¢ @ 1.60¢; Ordinary Fire Box, 1.75¢; Railroad Fire Box, 2¢. Our lower quotation on Tank Plate continues to be shaded for desirable orders.

Bars.—Indications point to a heavier volume of business in the near future. Freights, both East and West, have been lowered and the season is here when buyers usually increase their purchases owing to requirements of spring trade. While prices are not actually higher the tone of the market is improved. We continue to quote Steel Bars at 1.20¢ @ 1.25¢, with Bar Iron extras. Iron Bars are held at 1.15¢ @ 1.20¢ at mill, half extras.

Skelp Iron and Steel.—The plant of the Keystone Rolling Mill Company, idle since last June, resumed yesterday morning on a large order for Skelp Iron. Puddling is being done at \$4 $\frac{1}{2}$ ton. We quote as follows: Grooved Steel Skelp, 1.05¢ @ 1.10¢; Sheared, 1.15¢ @ 1.20¢; Grooved Iron Skelp, 1.25¢ @ 1.30¢; Sheared Iron Skelp, 1.35¢ @ 1.40¢.

Muck Bars.—We quote, nominally, at \$19.50 @ \$20.50, delivered at buyer's mill, for best grades. The demand is very light.

Pipes and Tubes.—A slight improvement in demand for the large sizes of Pipes is reported, and several large contracts for Line Pipe are now under negotiation and may be closed any day. The demand for the smaller sizes is dull and will hardly improve before spring. Prices are very low, depending altogether upon the nature of the order.

Wire Nails.—The market is an active one and prices are firm, with a tendency to higher values before long. Makers in the district report that they have sufficient business booked to take their entire output for the next two or three months, and some for longer periods. We quote Wire Nails at \$1.10 in carload lots and are advised that some mills are disposed to regard \$1.15 as the lowest price. There is also an improved demand for Cut Nails, the Wheeling mills reporting a considerable increase in business during the last two weeks. Prices are somewhat firmer, and we quote Cut Nails at \$1 @ \$1.05 in carload lots. For a large order with desirable specifications it is possible that our lower quotation would be shaded to a slight extent.

Barb Wire.—It is claimed that an understanding has been reached by Barb-

Wire makers under which the price for Four-Point Galvanized has been advanced to \$2.15 at mill, in carload lots, and 40¢ less for Painted. In view of the fact that the Barb Wire makers are having an extraordinary demand for their product, it is the impression that this price will be maintained for a time at least. Some additions are being made to the Galvanizing department of the plant of the Consolidated Steel & Wire Company, at Rankin, Pa. We quote Plain Wire at \$1.35 in carload lots, and are advised that the demand is quite large.

Connellsville Coke.—The demand for Foundry Coke is fairly active, but Furnace Coke is extremely dull, with prices ruling at a point where it is claimed there is no profit. Furnace Coke is being freely offered at 85¢ @ 90¢ per ton, although makers are not inclined to make long contracts at these prices. Foundry Coke is held at \$1.15 to consumers, although for desirable trade this price continues to be shaded more or less, say 10¢ @ 15¢ per ton. For the week ending Saturday, February 3, there were 8945 active and 8568 idle ovens in the Connellsville region, with a total estimated production for the week of 83,644 tons. This was a net increase of 1633 tons compared with the production of the previous week. In the active list of ovens there was a net increase of 370 ovens.

Louisville.

LOUISVILLE, KY., February 12, 1894

There have been several sales ranging from 500 to 1500 tons during the week, for deliveries running eight months; the prices named were lower than Iron has ever been offered from the South for an equal length of time, but are not thought to represent the market, as a portion of the tonnage was placed with a company who were desirous of getting their Iron introduced again into the mixtures of the parties buying, and was sold lower than the market. The other transactions were made by parties, it is reported, on their individual account, and not representing the furnace, taking the chances of the market meeting their views. No. 2 Soft is scarce and is held by the leading Southern companies at \$7.50 @ \$7.75, though in the transactions noted same was placed at less than \$7.25; Gray Forge is now being held by the largest furnaces at \$7, though in the transactions noted it was placed below \$6.50, Birmingham. Reports from other sections of a stronger feeling will tend to make more buyers close at present prices, and it is felt that the parties who took the transactions spoken of made a mistake in judgment. We quote for cash, f.o.b. cars, Louisville:

Southern Coke, No. 1 Foundry. \$12.00 @ \$12.50
Southern Coke, No. 2 Foundry. 10.50 @ 11.00
Southern Coke, No. 3 Foundry. 10.00 @ 10.50
Southern Coke, Gray Forge... 9.50 @ 10.00
Southern Charcoal, No. 1 Foundry... 13.00 @ 14.00
Southern Car Wheel... 15.50 @ 16.50

Macfarlane & Mordue, Incorporated, dealers in Iron, Coal and Coke, announce that their Thos. N. Mordue has retired temporarily, on account of ill health. Macfarlane & Co. will continue the business.

The American Tube & Iron Works, Youngstown, Ohio, have started up with 400 men. The shops had been idle for several months.

Metal Market.

Pig Tin.—The level of prices has gone somewhat lower. Actual Tin has been offered and sold at 19.60¢ @ 19.65¢, net cash, prompt or near future delivery; offers to sell June delivery at a remarkably wide discount and other offers at as low as 17.75¢ @ 18¢ for deliveries toward the close of the year were quite as feebly responded to. Ordinarily there would seem to be something of incentive to speculative venture in this wide range of prices, but the inducements have thus far proven unattractive. The explanation is offered that consumers are extremely conservative, that outside speculators keep far on the outside in view of the complicated condition of affairs and that the insiders are doing very little, for reasons best known to themselves. Hence a ragged sort of market and more than usual uncertainty pending solution of the problems that Tariff uncertainties make more than usually difficult to contend against. That there is enough Tin to meet current wants is plain. That there is a surplus seems to be quite probable, despite statistics tending to the contrary.

Copper.—Not the least difficulty has been experienced in filling orders for Lake Superior Ingot at 9½¢, prompt or near future delivery. Buyers, however, have been extremely few and far between. Well timed offers at 9½¢ for early deliveries were quite as ineffective in leading to business, and bids above 9½¢ have been exceedingly difficult to draw out. Other varieties have not fared quite as poorly, but they are slow of sale nevertheless, and 9½¢ for electrolytic and 9¼¢ for ordinary casting stock are full rates where other than jobbing lots may be involved.

Pig Lead.—The market is weaker. It is easier to buy at 3.30¢ here and very difficult to secure bids above 3.20¢ here for prompt or future deliveries. The speculative interest seems to have enough, and consumers in this quarter are doing nothing to speak of beyond merely routine buying. Hence a dull condition of affairs and general hesitancy that effectually operates to check the intended influence of restricted production reported from some quarters of late.

Spelter.—Prices were carried up to as high as 4¢. There was no business. The maneuver seemed to have been purely speculative, with the backing of advices to effect that an agreement has been made to restrict production with a view to turning prices for the better. In other words, it was a speculative move that is distrusted at present, since offers have very recently been made to sell at 3.85¢ @ 3.90¢ for carload lots, delivered here or at common points, while quotations from the West were relatively a great deal higher.

Antimony.—Sales have been merely routine and the market is barely steady. Hallett's may be secured at 9½¢ @ 9¼¢ and Cookson's at 9½¢ @ 9¼¢ on the spot.

Nickel.—The range of quotations is 45¢ @ 50¢. Sales have been made lately at 45¢, and that is doubtless the truest representation of actual market value.

Tin Plate.—No improvement has taken place in sales for either prompt or future deliveries. In fact, business is slower, if anything, than usual at this season of the year, and the market is quite bare of any improvement in form or appearance. For spot goods the following prices are quoted: Coke Tins

—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., \$5.32½ @ \$5.35; Bessemer full weight, \$5.20 @ \$5.25; light weights, \$4.80 @ \$4.85 for 100 lb, \$4.77½ @ \$4.80 for 95 lb, \$4.60 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.45; Siemens Steel, IC basis, \$5.55 @ \$5.60; IX basis, \$6.60. Charcoals—Melyn grade, IC, \$6.35; Crosses, \$7.87½; Allaway grade, IC, \$5.50; Crosses, \$6.65; Grange grade, IC, \$5.60; Crosses, \$6.75. Charcoal Terns—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.25; do., 20 x 28, \$14.50; Dean grade, 14 x 20, \$5.35; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$9.90 @ \$10; Alyn, 14 x 20, \$5.35; do., 20 x 28, \$10.50; Wasters—S. T. P. grade, 14 x 20, \$4.75; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.60; do., 20 x 28, scarce.

David T. Day, Chief of the Division of Mining Statistics and Technology, United States Geological Survey, has issued the following preliminary statement by C. Kirchhoff, agent, of the production of Lead for the year 1893:

	Short tons of 2000 pounds.	1891.	1892.	1893.
Desilverized Lead.	171,000	181,564	182,575	
Soft Lead.	31,397	31,078	31,198	
Total production refined Lead.	202,406	213,262	213,773	
Retained in bond.	2,701	12,874	35,000	
Available for home market.	199,706	200,388	178,773	
Contents of Mexican and Canadian Ores imported.	21,152	26,734	29,270	
From American sources.	178,554	173,654	149,503	

Returns from producers show that there were in the hands of smelters of soft Lead and desilverizers 6311 net tons of refined Lead on January 1, 1894, as compared with 6411 tons on January 1, 1893. The stock of soft Lead has declined from 2169 to 1799 net tons.

Included in the above production is 4876 tons of antimonial Lead for 1893, as compared with 5039 tons in 1892 and 4043 tons in 1891.

Financial.

The new Government loan has failed to stimulate to any appreciable extent either speculation or general business. Trade, while showing a slow and deliberate advance over that of last month, keeps very much below expectation. Such improvement as has developed appears to be due altogether to a demand for goods to replenish depleted stocks, in order to meet the absolute needs of consumers, and does not indicate any revival of confidence or enterprise. The disturbing factor of uncertainty in respect to the tariff bill now in the hands of the Senate, and to the future financial policy of the Government, still operates to repress business enterprise and is likely to continue to influence the financial and commercial community adversely until these questions are actually settled.

The week has been a dull and featureless one financially, with no startling changes in the direction of improvement or the reverse. The most notable feature has been the extraordinary decline in the prices of silver and of wheat, both of which broke all previous lowest records. May wheat was sold in Chicago on Tuesday at 58½¢, an altogether unprecedented price, and it is thought that the price is not apt to pick up again in any marked degree at

present, as receipts from the West have been larger than usual, while Atlantic exports are not a third of last year's, and stocks in hand do not diminish.

The railroads lately reporting exhibit poor earnings, and Western roads are likely to make a yet more unfavorable showing for the first half of this month on account of the recent severe snow storms in the West, which have seriously impeded the movement of trains. West bound freight traffic decreased in January 21.5 %, as compared with that of last year, and there is a prospect that the decline may continue. The *Financial Chronicle* computes the gross earnings in January of 123 railroads at \$34,528,146, a decrease of \$4,819,853 from the corresponding month last year. This is equal to 12½ %, while the number of miles operated was larger than in the preceding year by over 3000 miles. The loss in earnings was owing in part to the unsatisfactory reports for the fourth week, in which the decrease amounted to 15.9 %. On the other hand, some lines of industry, notably the iron and textile trades, show gains in the volume of business, with some improvement in values. Exports to foreign countries for last week exhibited a gain over those for some weeks previous, while the failures reported in the United States were less in number and in importance.

The Treasury gold reserve, with the aid of the recent loan, again stands above the \$100,000,000 mark, and the Government receipts from customs and internal revenue for the week ending last Saturday show a gain of \$700,000 over those for the preceding week. Saturday's statement of the New York banks naturally showed some important changes in consequence of the large payments made for the new Government bonds, although these are not quite fully reflected in the statement. The decrease in cash shown is \$30,397,300. This is accompanied by an increase in loans of \$13,055,000, which is attributed to borrowing by financial institutions that had subscribed for bonds. The movement of money from the interior to New York still continues, although on a smaller scale than a few weeks ago, nor does it show any present sign of an ebb. All the changes shown in Saturday's statement resulted in a decrease of nearly \$26,000,000 in the surplus reserve, leaving it at \$85,633,700. The following is a comparison of the averages of the New York banks for the last two weeks:

	February 10.	February 3.	Decrease.
Loans.....	\$132,585,000	\$419,580,500	*\$13,055,000
Specie.....	17,799,700	129,558,900	21,759,200
Legal tend- ers.....	111,378,100	120,016,200	8,638,100
Deposits.....	534,176,400	551,808,400	17,632,000
Circulat'n.	12,422,000	12,602,900	180,300

* Increase.

The following shows the relation between the reserve and the liabilities:

Specie.....	\$107,799,700	\$129,558,900	\$21,759,200
Legal tenders.	111,378,100	120,016,200	8,638,100
Total reserve...	\$219,177,800	\$249,575,100	\$30,397,300
Reserve re- quired against deposits.	133,544,100	137,952,100	4,408,000
Surplus reserve...	\$85,633,700	\$111,623,000	\$25,989,300

It was thought that the loss of between \$40,000,000 and \$50,000,000 by the city banks through payments for the Government bonds would reduce the offerings of bonds in the money market and strengthen loaning rates,

but such was not the case. Interest rates, as a matter of fact, took the opposite course, and show a decline all along the line. Call money on stock collateral has been very easy at ½ % @ 1 %, while of time loans the supply has been large at 2 % for 30 to 60 days, 2½ % for 90 days and 3 % @ 3½ % for four to seven months, with only a limited demand from borrowers. In mercantile paper the weakness has been most marked. There has been an eager demand for good paper by the banks, but very small offerings, and rates have declined to about the lowest on record, being quoted at 3 % @ 3½ % for indorsements and 4 % @ 4½ % for single names. The following list, given by the *New York Journal of Commerce*, of rates of call loans and commercial discounts at some interior points, as compared with those ruling in New York at the end of last week, forms a very striking illustration of the curious conditions now prevailing in this financial center owing to the glut of money in the banks:

	Call loans.	Commercial discounts.
New York	½ @ 1	3 @ 3½
Boston	2½ @ 3	3 @ 4
Philadelphia.....	3 @ 3½	4 @ 4½
Pittsburgh.....	5½ @ 6	6 @ 6½
Chicago.....	4 @ 5	6 @ 7
St. Louis.....	6 @ 7	6 @ 7
Louisville.....	7 @ 8	7 @ 8
Omaha.....	7½ @ 8	8 @ 10
Detroit.....	8 @ 8½	7 @ 8
Denver.....	10 @ 12	10 @ 12
New Orleans.....	7 @ 7½	8 @ 8½
Savannah.....	7 @ 8	8 @ 10
Montreal.....	5½ @ 6	6½ @ 7
Toronto.....	5 @ 5½	6½ @ 7

The week's business on the Stock Exchange has been remarkably narrow in volume and almost entirely "professional" in character—that erratic stock, American Sugar, representing fully one-third of the total dealings. Very few other stocks have scored sales of more than 5000 shares in any one day, except St. Paul, which most closely approached Sugar in activity. The decline in the price of wheat and silver at the close of last week imparted a tone of hesitation to the market, which closed on Saturday dull and lifeless with only fractional changes in the leading issues. The reports of a severe storm raging in the West, and the weakness in wheat induced on Monday a "bear" attack on the Grangers, which sold down a point or two. New York Central also being an object of attack, and falling 2½ points. New England and Reading both scored small gains, however, on favorable news as to the progress of the reorganization plans for those roads. A rally of wheat on Tuesday and the absence of failures in Chicago caused the stock market to recover its tone somewhat. Stocks closed generally irregular, but the market was dull and narrow and nothing but fractional gains were recorded. The following list shows the extreme fluctuations during the past week in the few stocks that showed any activity, together with closing prices on February 14:

	High- est.	Low- est.	Closing Feb. 14
Am. Sugar Ref.....	83½	79½	81½
Chicago Gas.....	64½	63	63½
Chic., B. & Q.....	76	74½	74½
Chic., Mil. & St. Paul.....	59½	55½	56
Chic., Rock Isl. & Pac.....	67½	65	65½
Gen. Electric.....	36½	34½	35½
Lake Shore.....	127	125	125½
Louisville & Nashville.....	46½	45	45½
National Lead, Common.....	29½	28½	29½
New York Central.....	100	96¾	98½
N. Y. & New England.....	12½	10½	11
Philadelphia & Reading.....	22½	20½	21½
Richmond & West Pt. Term.....	4½	3½	3½
St. Paul & Omaha.....	37½	35½	35½
Western Union.....	83½	82½	83½

Government bonds have remained quiet and firm, the closing quotations on Wednesday being as follows:

	Bid.	Asked.
2's, 1891, registered.....	96	96
4's, registered.....	113½	114½
4's, coupon.....	113½	114½

Railway and general bonds of high grade are strong and continue in very good demand, but the supply is very light and all new issues of unquestionable character are immediately absorbed. Prices incline upward.

The market for sterling exchange has been firm and dull, with only light offerings of bills and a rather larger demand from importers. Actual business was done on Wednesday at \$4 84½ @ \$4.85 for 60 days, \$4 87 @ \$4 87½ for demand, \$4 87½ @ \$4 88 for cables and \$4.84½ for commercial. Domestic exchange on New York is quoted as follows: New Orleans, commercial 50 premium, bank 100 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 25, telegraph 30 premium; Savannah, buying par, selling ½ premium; Chicago, 40 premium; St. Louis, 60 premium.

The sudden drop of silver in the London market brought the price of the metal down to 29½ pence per ounce, toward the close of last week, the lowest point it has yet reached. A reaction to 30½ pence on Monday was followed by another drop to 29½ pence, at which bar silver was quoted in London at the close on Wednesday. In New York the price was 64½¢ per ounce. The eastward shipments of silver bullion during the week have fallen off in volume.

New York.

Office of *The Iron Age*, 96-102 Reade street, {
NEW YORK, February 14, 1894. }

Pig Iron.—While agents of standard brands of Northern Iron have little new business to report, it is clear that Southern furnaces, and particularly those of Virginia, have succeeded in inducing a number of buyers in New England to cover their requirements for the current year. A radiator manufacturer in Connecticut has purchased 5000 tons to cover this year's requirements. A manufacturer of valves in Boston has covered his wants for half the year and is in the market for the other half. Two Boston stove foundries have purchased a total of 6000 to 8000 tons, all this business having been done on the basis of \$12 @ \$12.50 for No. 2 Foundry. The fact that these buyers have taken hold is regarded as a proof that some consumers at least are convinced that the bottom has been reached. Stocks in the hands of founders are notoriously lower than they have ever been, so that any spread of the buying movement is regarded as likely to bring about a recovery in values. The report from Louisville that Foundry Forge has sold at less than \$6.50 is explained by the fact that during the panic when Southern furnace paper sold repeatedly at 24 % discount some of the companies paid their creditors with Pig Iron. It is this Iron which has been cropping up in the market from time to time and has sold at the record breaking prices. We quote standard brands \$13 @ \$13.50 for No. 1; \$12.50 @ \$13 for No. 2; \$11.75 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13 @ \$13.50 for No. 1; \$11.75 @ \$12.50 for No. 2; \$11.50 @ \$12 for No. 3; \$11.50 @ \$11.75 for No. 2 Soft, and \$12 @ \$12.50 for No. 1 Soft.

Foundry No. 4 (Foundry Forge) is \$10 75 @ \$11.25.

Ferromanganese and Spiegeleisen. No business is reported by importers. We quote domestic Ferromanganese \$52 @ \$52.50, tidewater, and foreign Spiegeleisen nominally \$21 @ \$22 for 10 %, and \$24 50 @ \$25 for 20 %.

Billets and Rods.—A sale of 4000 tons of Billets, one-half Soft and one-half High Carbon, is reported at \$18.70, delivered at the purchasing Rod mill. Some Eastern business is soon expected in this market. We quote \$18.50 @ \$18.75, tidewater, for domestic, and \$27 @ \$27.50 for foreign Billets. Wire Rods are stiffer. Domestic Wire Rods are \$26 75 @ \$27, tidewater, while foreign remain nominally \$39 @ \$40.

Steel Rails.—The market is dull and remains \$24 at mill, or \$24.80 at tidewater, for standard sections.

Track Material.—We quote as follows for small lots: Spikes, 1.70¢ @ 1.90¢; Fish Plates, 1.35¢ @ 1.40¢; Track Bolts, Square Nuts, 2.10¢ @ 2.40¢, and Hexagon Nuts, 2.30¢ @ 2.50¢, delivered. Concessions would be made for round lots.

Steel.—Quite a number of contracts have been placed during the current week, although at low prices. The Iron work for the Starin pier, about 900 to 1000 tons, has been taken by a Central Pennsylvania mill. An Eastern mill has taken about 500 tons for the Ogden avenue approach and about 300 tons of Beams for the Jersey City Court House. A Western bridge concern was the lowest bidder on 1330 tons of work for the north approaches of the Harlem Bridge. The work for the Paterson armory will be given out soon. There is some talk of further extending the Fifth avenue elevated road in Brooklyn. Large new office buildings and other fire proof structures are coming up daily and the architects' offices are reported to be full of work. As yet, however, none of the larger contracts have been placed, although there are rumors that some extraordinary bids on Beams have gone in for a great Broadway building. Competition on Beams has been very lively lately, some of the Eastern mills taking a hand in the fight and undercutting the Pittsburgh works. In Plates a small order for Oil Tank work was taken by a Pittsburgh mill at about 1.25¢, delivered, the lowest thus far reached in this market. We quote nominally: Beams up to 15-inch, 1.45¢ @ 1.50¢, for round lots; Angles, 1.35¢ @ 1.50¢; Universal Mill Plates, 1.35¢ @ 1.50¢; Tees, 1.65¢ @ 1.90¢; Channels, 1.45¢ @ 1.60¢, on dock. Steel Plates are 1.30¢ @ 1.50¢ for Tank; 1.50¢ @ 1.65¢ for Shell; 1.70¢ @ 2¢ for Flange; and 2¢ @ 2.50¢ for Fire Box, on dock; Refined Bars are 1.40¢ @ 1.9¢, on dock, and Common 1.25¢ @ 1.30¢; Soft Steel Bars are 1.80¢ @ 1.50¢; Scrap Axles are quotable at 1.5¢ @ 1.60¢, delivered; Steel Axles, 1.5¢ @ 1.60¢, and Links and Pins, 1.5¢ @ 1.70¢; Steel Hoops, 1.50¢ @ 1.70¢, delivered; Cotton Ties, 70¢ @ 72½¢ for 45-lb bundle, at mill; Machinery Steel, 1 45¢ @ 1.50¢; Toe Calk, 1.90¢ @ 2¢, and Sleigh Shoe, 1.65¢ @ 1.75¢, delivered.

Old Material.—Old Steel Rails are \$9 @ \$9.50, and Old Iron Rails, \$11.75 @ \$12.

The firm of Thorp & Bond has been formed by W. S. Thorp and C. F. Bond, to engage in structural Iron work and

the building of bridges, factories, warehouses and other buildings. W. S. Thorp was for about ten years superintendent of the Iron construction for the Philadelphia public buildings and lately with the firm of Thorp, Conlan & Co., structural and ornamental Iron workers. C. F. Bond was for nearly nine years connected with the engineering department of the New York Central & Hudson River Railroad and was formerly a member of Bond & Co., building contractors.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 14, 1894.

Pig Tin prices have averaged somewhat lower and the market remains in rather uncertain shape, with an undercurrent of weakness the most prominent feature. The irregularity in foreign demand and uncertainty regarding the American tariff has checked business, and this, along with heavy spot supplies and adverse reports as to the condition of the American market, caused more or less pressure to sell. Under the influence of this there was a drop to £69. 5/ @ £69. 7/6 for prompt deliveries. The unsettled condition of silver and exchange also served to unsettle the market. From the lowest point reached some reaction has taken place, but the market is still rather soft. Latest dealings were at £69 for prompts and £69. 17/6 for three months' futures.

In the market for Copper there has been hardly any change, but the tone is weak and affected more or less by unfavorable reports from New York and indications of a very unsettled condition of affairs there. This caused some sales to be made of Merchant Bars at as low as £40. 17/6, or about 5/ below popular market quotations. This break led to some covering of short account and purchases for consumption also. It is believed that holdings of nervous operators have been about all closed out. Latest dealings in Merchant Bars were at £41. 2/6 for prompts and £41. 10/ for three months' futures. Best Selected English was quoted £44 @ £44. 10/.

In Tin Plates the position is unchanged. There is more inquiry, but prices are invariably low. American affairs, as indicated in late accounts, seem to be producing a more hopeful feeling. Fair orders have been placed for all sizes for both American and Russian account, but purchases are still about the average for the season, and there is no improvement in prices. Exports last month were 31,696 boxes, as against 31,377 boxes in January, 1893. The movement to the United States included 18,000 boxes and 23,000 boxes, respectively. There is now in stock at Swansea about 280,000 boxes. Shipments the past week have been very heavy, particularly to Batoum and the United States, or over 30,000 boxes all told. Low prices have an unfavorable influence upon production, however, and it is stated that several establishments have been closed down owing to

the poor condition of business. Liverpool prices are quoted as follows:

IC Charcoal, Alloway grade.....12/3 @ 12/9
IC Bessemer Steel, Coke finish.11/ @
IC Siemens11/3 @
IC Coke, B. V. grade, 14 x 20.....11/ @
Charcoal Terne, Dean grade.....10/6 @

Pig Lead has been a shade firmer, but the market is now rather slow, with sellers at £9. 5/ for ordinary Spanish.

Spelter is in limited demand, and the market remains easy, with sellers at £15. 15/ for ordinary Silesian.

In the Steel trade business is running slow and several Barrow mills have been shut down owing to slowness of orders. Exports of Pig Iron last month were only 25,000 tons, against 45,000 tons in January, 1893. The stoppage was chiefly for alterations. Prices for warrant Iron have ruled somewhat lower and reflect a rather soft market. Latest transactions were at 43/6 for Scotch, 36/ for Cleveland and 45/6 for Hematite.

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HARDWARE.

Condition of Trade.

TRADE IN JANUARY was undoubtedly much more satisfactory than for a number of months, and was, perhaps, on the whole, nearly up to the usual average for that month. It was, however, somewhat uneven, and with some houses the volume of business was much more satisfactory than with others. There is still a continued improvement to be noted, and the volume of business is growing. While trade is gradually assuming a more normal type it still, however, unquestionably feels the effect of the contraction and distrust of the past, and merchants are still placing their orders with caution and care. Orders from the small trade are referred to as covering a varied line of goods, in which seasonable specialties have a prominent place. Such orders indicate from their make up that stocks in nearly all lines are somewhat depleted. There is a disposition on the part of buyers, especially in the larger houses, to place orders for future rather than immediate delivery. Prices are without important change, though it is to be noted that on some staple goods the market is decidedly firmer than a few weeks ago. As a result of the business conditions which have existed for some time manufacturers in many lines have much less than the usual quantity of goods on hand, and it is not unlikely than if an active demand should set in more or less of scarcity would be developed. This is thought not unlikely to occur in Wire Cloth and Poultry Netting, lines in which there has of late been a good deal of active competition between the manufacturers. The prices on general Hardware continue on the whole fairly well maintained, but concessions are made somewhat more freely than heretofore, with a view to obtaining orders. The financial condition is on the whole fairly satisfactory, and there is comparatively little complaint in regard to collections. There is also evidence that capital is beginning to seek investment in new enterprises, and this, with a more general resumption of work in mills and factories, cannot help having a good effect upon trade in general.

Chicago.

(By Telegraph.)

The volume of business steadily grows. In fact, there is more of a disposition to buy than jobbers generally feel willing to gratify. They are tightening the reins on those who have old bills hanging, and insist that such accounts should be settled before new obligations of any considerable amount are incurred. Although collections are good when everything is considered, yet there are an unusual number of merchants in arrears on last year who were granted time during the financial stringency, and who now think still more time can be taken. Buyers whose credit is good are treated very differently. They are urged to load up and are advised that this is a good time to lay in stocks, especially of any articles in which the material constitutes the greater part of its value. Much stress is laid on the recent advance in Steel Billets, which is expected by the shrewdest jobbers to have a decided effect before long on a wide range of products. A recent interesting feature of this market has been the number of new stocks bought by parties in numerous places in the Northwest who believe that this is a good time to start in business. The heavy demand continues for all kinds of staple goods and gives no sign of an early abatement. Jobbers of heavy Hardware are not doing as much business as they would like and considerable complaint is heard among them of the backwardness of the trade. Orders are fairly numerous, but they are small, and the very low prices now prevailing make daily sales in dollars and cents seem discouragingly light.

St. Louis.

(By Telegraph.)

There is a fair volume of business, but nothing in the way of large orders is being received. Retailers continue to buy from hand to mouth, and while orders are not large they come with more frequency. Barb Wire is moving in good quantity and prices are firmly held at the recent advance. Wire Nails are a trifle better, the price of \$1.10 by a local house having been withdrawn and \$1.15 substituted. Other jobbers ask \$1.30 to \$1.35. Builders' Hardware is not moving freely. In the way of Tin Plates, Galvanized Iron, &c., trade shows a decided increase. Collections are reported to be in a better shape than at any time during the past year.

Cleveland.

THE W. BINGHAM COMPANY.—The percentage of decrease in trade as compared with corresponding months is

growing continually less, but it will be some time before it gets back to its old channels. January trade was fair; Shelf Hardware, perhaps, not in proportion. Mechanics' Tools are still dull. Staples are in large demand and prices on Wire and Wire Nails have advanced considerably.

Baltimore.

CARLIN & FULTON.—Since the first of the year trade has been fairly good except in such sections as have depended upon mining and manufacturing, and though purchases have in very few cases been for large amounts yet the aggregate shows a volume of business probably equal to that of last year for the corresponding time, though with a recollection of the dull times of 1893, we are not having much to boast of unless we can do better.

That there is an active consumption or at least a demand, perhaps speculative, in some lines of goods, is shown by the stiffening in price of Barb Wire and Wire Nails from the ruinous figures of a few weeks ago, and it seems that the mills are pretty full of orders, as far as the products of Wire are concerned.

We wish we could say the same for all other lines in our business, but though we cannot point to advances in price, we believe that, tariff or no tariff, prices have touched bottom, unless it be Shot, which generally starts the week with a decline of 5 cents per bag.

There seems to be a greater inclination on the part of the better class of trade to pay old obligations rather than increase their indebtedness, and collections are really better than sales. We do not mean by this that accommodations do not have to be granted to some, and in fact to many, but when was such not the case?

The severe lessons of last summer have taught the trade that it is better in such times to keep close to shore than to push business as has been done in calmer days, and the conservatism which now marks the course of our ablest and most responsible houses is bound to result in good in the not distant future.

Louisville.

W. B. BELKNAP & Co.—Business for January was fairly satisfactory, most lines exceeding in volume that of the previous year. This month starts in with a fair showing, but nothing on which to base any extravagant calculations. With the prices ruling, it is hard to make any great aggregate showing in dollars and cents.

The advance in Wire and Wire Nails seems legitimate and fully justified by the enormous demand which was created by the low prices recently prevailing. All of the makers seem to have gathered a good deal of courage from the tonnage offered by buyers and to feel that the time had come for a reaction. The manufacturers of the above goods have been behind with their orders for quite a while and are still so. Ten days or two weeks, or

even longer, are required to fill the most ordinary specifications.

There is reported to be a better movement in the higher grades of light Sheets. This class of Iron has not shared the extreme depression of Bars and raw material.

Money is abundant everywhere, and is beginning at last manifestly to seek fields of profitable investment. For the first time since the panic new schemes have been broached. The fact that they find any audience at all is encouraging.

If the Senate would settle the tariff matter so that there would be no further doubt on that score it would go a good way, we think, toward swelling the tide of confidence which has already set in.

Bar Iron continues low, with only moderate consumption, and there does not seem to be much prospect of speedy recuperation in that with the competition of Steel to be met.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Business has moved along this month very much as expected. The Northwest has been favored with fine weather during the whole winter thus far, which has not only been very favorable to the poor in our cities and also out on the prairies, but it has also placed no hindrance to business at any time to any appreciable extent. Our railroads have had no blockades, so that whatever business these times would afford has been allowed to reach its regular channels without disturbance.

We cannot say for this center, as we see some of your correspondents state for their localities, that trade is good and the prospects are better than at the same period last year. On the contrary, a considerably lighter trade than that of last year in the first quarter has been expected and will doubtless be realized.

But the trade is up to expectations and probably will continue so, and jobbers have started out with their plans for the year based on this expectancy and will likely not be caught napping.

The area of territory tributary to St. Paul is immense and the actual wants of the people that must be supplied are considerable, and this means that orders will be large in number and small in quantities. Prices are generally firm, though the retail dealers are buying their first round of Wire and Nails at very low prices.

Philadelphia.

SUPPLEE HARDWARE COMPANY—Whatever credence may be given to the various reports regarding general trade, we must admit a general improvement in the weekly distribution of Hardware since about January 15. The year 1894 opened with a showing of the smallest stock of Hardware in hands of the interior merchant for many years, and, unless merchants were willing to sit idle and see their trade pass from them they had no other alternative than to replenish their ill-assorted and depleted stocks.

We stated in our letter to *The Iron Age* of February 1 that there was a visible effort on the part of jobbers to avoid taking orders for Barb Wire, Wire Nails, Green Wire Cloth and Poultry Netting. Almost simultaneously with these remarks there was a visible effort on the part of the man-

ufacturers of the first two named articles to avoid taking orders. The result of this was a quick effort on the part of the trade to cover themselves and to provide for their wants. With this quick demand it was soon learned that manufacturers had oversold their immediate capacity. Then came an advance of 10 cents a hundred pounds on Barb Wire, followed by a firm advance of an additional 5 cents, and an impression prevails that an additional 10 cents will soon follow. It now looks as if there must be some delay before recently taken orders can be fully executed.

The advance was stimulated, of course, by the sudden turn and quick advance in Billets, both in this market and in Pittsburgh. Billets had reached the lowest point ever before learned, and many large sales have been reported during the last three weeks, and a further advance in Billets must naturally depend upon early requirements.

The advance in Wire Rods had a corresponding advance in Wire Nails, which are firm at 10 cents a keg advance, and the demand quite as great and even more active than before the advance. The trade cannot complain that they did not have fair warning; although, with the receding market, it is a difficult problem to solve just how low a point prices may reach.

We must take into consideration, however, that we have now had an object lesson of diminished trade for eight months, and during a greater portion of this time buildings and industrial improvements had temporarily ceased, and merchants were starving their stocks, thus causing the closing of mills and contraction of production.

Cut Tacks have passed through the third advance and are likely to remain firm for the present at least.

There is a perceptible increase in the number of mills starting up, and but comparatively few that have continued in operation are now closing. Those that are closing, as a rule, we think, are closing in order to settle the wage problem, while those that are resuming operations are doing so with a sharp decline in wages of from 10 per cent. to 30 per cent. The workmen, are passively accepting the situation, as it is a well understood and acknowledged fact that full resumption can only be accomplished through these channels; and there is no question but the uncertainties of what Congress may do with the tariff and currency question prevents many mills from starting, and thus keeps up the corps of unemployed, many of whom still depend upon charity's funds. But manufacturers cannot run any great amount of risk with the uncertainty of this foreign competition, which may, at an early date, knock for entrance at the doors of our custom house.

This cannot affect general Hardware prices, for we must bear in mind that manufacturers of Hardware took a conservative view early last summer, and kept men employed at reduced wages and hours to enable them to fill orders only; but it will require some months before textile and, indeed, many other manufacturers can tell where they will stand six months later. This they do know, however: the ultimate result can be nothing else than reduction of wages. That is a settled fact and cannot be otherwise. Were this evidence not before the eyes of the workman we would not see him going to work so peacefully at the reduced wages offered.

We have recently been informed of one delegation who waited upon the manufacturers and stated that they should be shown the net results of the profits of their business for the past year and why a reduction in wages was neces-

sary. The result was shown and the objectors could hardly be made to believe that the small and indifferent showing of the results was not doctored, as it was a surprise to learn they were not the "robber barons" they had been pictured.

With a maximum of production and sales, with a minimum of profit, those small profits have not been the result of peace and combinations (as the Congressional proceedings have indicated), but the result of manufacturers' and industrial warfare, almost to the bitter knife, in which the most improved machinery, most intelligent superintendent and most rigid economy (outside of wages) have been practiced, but workmen, owing to the strife of various manufacturers for experienced and reliable workmen, coupled with the magnanimity of the employer, as a rule, have been the best paid and most liberally treated workmen in the known world, even to astonish the unbelief of the Europeans who have recently visited this country.

Collections come in a trifle more freely, which is attributable somewhat to stimulated trade. Failures are a little less numerous, and liberal assistance has been freely given to financial sickness, but vitality sometimes runs its course. Occasionally, however, we have strong evidence of financial sickness to cover other ailments and thus deceive those who have granted assistance.

New Orleans.

A. BALDWIN & Co.—The present week has been very active, owing to the large number of visitors to this city attending the carnival festivities.

A great many took advantage of this opportunity to combine both business and pleasure. Their purchases were not very heavy, although, in the aggregate, they were about what we usually expect during this season. There is a decided hesitancy on the part of any of the merchants to buying goods for stock and they are simply buying for actual wants. The extremely low price of leading staples does not seem to be any inducement for them to purchase largely. We look for a considerable falling off in the next few months.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—The conditions noted in our last still prevail. Sales are moderate and a wise conservatism is observable in selections as well as in quantities.

Collections, as compared with the amount of trade that is doing, are fair, but not what is to be desired considering the aggregate of outstandings.

The weather so far has been favorable from an agricultural standpoint. Prices remain substantially without change.

Notes on Prices.

Wire Nails.—In sympathy with the advance noted below in Barb Wire, the prices of Wire Nails are higher, and the market is now represented by the quotation of \$1.10 for carload lots at factory, with the usual advance for small lots. The manufacturers are full of orders, the trade both large and small having been purchasing freely since the opening of the year, and the tone of the market is firm, with some prospect of a further advance in price.

Chicago, by Telegraph.—The change which has recently occurred in the

Wire Nail trade is one of the most extraordinary events in the history of the business. It is but a few days since manufacturers were urgently soliciting orders and offering very low prices, which buyers seemed afraid to take up. Now the buyers are soliciting manufacturers to accept more business and are urgently calling for earlier shipments on orders they have placed. The factories are overflowing with work, some being well sold up to May, and yet plenty of buyers are turning up who have not covered their wants. Manufacturers' prices are about \$1.20, Chicago, but higher rates are imminent because raw material is scarce and dearer. Wire Rods are hard to get, the mills being well sold up far into the future. The last cloud was lifted from the market a few days since, when all quotations were withdrawn by the then cheapest Wire Nail concern. What has happened in this trade is taken as an indication of what may be expected when buyers begin to stock up in other lines. Jobbers quote carloads and mixed carloads at \$1.20 and small lots at \$1.25.

Cut Nails.—There is little change to note in the Cut Nail market and prices continue as before. The market in the East is represented by the manufacturers' quotation of \$1.05 for carload lots on dock, New York; and the Western market by the quotation of \$1 to \$1.05 at mill. In sympathy with the improved condition of Wire Nails the Cut Nail market has, however, a somewhat better tone.

Chicago, by Telegraph.—Manufacturers of Cut Steel Nails have not enjoyed as heavy an increase in trade as the Wire Nail people, but report a considerably larger movement, with prices still quoted on the basis of \$1.05, Chicago, for 60-cent average. Jobbers sell small lots from stock at \$1.15 to \$1.20.

Barb Wire.—The improved condition of the Barb Wire market referred to in our last issue still continues and higher prices are now quoted by all the manufacturers. The market is now represented by the quotation of \$2.15 for carload lots of Galvanized Four Point at Pittsburgh, \$2.20 at Cleveland, \$2.25 at Cincinnati or Allentown, and \$2.35 at New York. The understanding between the manufacturers in regard to these advanced prices was reached in view of the fact that the demand has been heavy and most of the mills are well filled with orders. The expectation of a continued heavy demand during the season and the advance in Billets also influenced their decision. In this condition of things the market is decidedly firmer and manufacturers intimate that a further advance is not unlikely.

Chicago, by Telegraph.—The movement in Barb Wire parallels that in Wire Nails. Manufacturers are doing a heavy business and the recent advance

to \$2.25, Chicago, for Galvanized has stimulated trade rather than checked it. Special brands of Wire are now firm at \$2.40 and moving freely at that price. Jobbers report a much better business in this line and have advanced their quotations on carloads and mixed carloads to \$2 for Painted and \$2.40 for Galvanized, with 5 cents advance for small lots.

Rope.—There has been within the past few weeks no change in the current prices for Rope and the market is firmer than for some time. The manufacturers refer to the decline in prices as having been checked. The demand is, however, light.

Bridgeport Cigar Tuck Cutter.—This article was described in our issue 1st inst. It is put on the market by Charles A. Wheeler, 108 Catharine street, Bridgeport, Conn., by whom it is sold to the trade at \$9 per dozen, subject to a discount of 33½ per cent.

Sample Holder.—Thompson's Sample Holder, manufactured by Massey & Thompson, Monroe City, Mo., is now sold at the following reduced prices: \$7 per gross, assorted, four sizes; 65 cents per dozen in quantities less than half gross.

Cash Register.—The Improved Sun No. 10 Cash Register, manufactured by the Sun Mfg. Company, Greenfield, Ohio, and illustrated in *The Iron Age*, February 8, 1894, is sold at \$60, f.o.b. factory.

Climax Ratchet Stock.—Clarence M. Kemp is putting this device on the market. A description of the Stock was given in our last issue. It is sold from the following list, which is subject to a discount of 25 per cent. to the trade:

No. 1, threads ¼ to 1 inch pipe, takes die 2 or 2½ inches square.....\$10.00
No. 2, threads 1½ to 2 inch pipe, takes die 2 or 2½ inches square..... 17.00

Shot.—The active competition between the manufacturers of Shot to which we referred in our last issue is evidenced by the reduced prices given below, which are announced under date February 12. Terms 30 days, or 2 per cent. discount for cash in ten days from date of invoice:

	Per bag.
Drop Shot, sizes smaller than B, 25 pound bags.....	\$1.15
Drop Shot, sizes smaller than B, 5-pound bags.....	.35
Drop Shot, B and larger sizes, 25-pound bags.....	1.40
Drop Shot, B and larger sizes, 5-pound bags.....	.40
Buck and Chilled Shot, 25 pound bags	1.40
" " 5-pound "	.40
Dust Shot, 25-pound bags.....	2.00
" " 5-pound "	.45

In lots of 2000 pounds and upward taken at one time a discount of 5 cents per bag (25 pounds) will be allowed, together with a special discount of 2½ per cent.

The Bernard Pliers.—The following are the list prices of the Bernard Pliers, which are manufactured by Julius Ber-

becker & Co., 65 Duane street, New York. The list is subject to a discount of 30 per cent.:

Electric Plier.....\$30 per dozen.

Flat Nose Plier.

	4½	5½	6½	7½	inch.
Extra heavy.	\$7.00	9.00	11.50	15.00	per dozen.
Extra Jaws	2.25	2.50	2.75	4.25	"

Round Nose Plier.

	4½	5½	6½	7½	inch.
Extra heavy.	\$7.00	9.00	11.50	15.00	per dozen.
Extra Jaws.....	2.25	2.50	2.75		"

Cutting Plier.

	4½	5½	6½	7½	inch.
Per dozen....	\$11.50	14.50	17.50	24.00	
Extra Cutting Jaws.....	4.50	5.00	5.50	7.00	
Extra Cutting Blades.....	2.75	3.00	3.25	4.00	
Extra Center Screws.....	.25	.30	.35	.40	
Extra Bolts and Nuts.....	.45	.50	.55	.60	

Gas Plier.

	7 inch.....	\$13.00	per dozen.
Extra Jaws.....		3.75	"

Chandelier Plier.

	4½	5	inch.
Extra heavy.	\$8.50	9.50	per dozen.
Extra Jaws.....	2.50	2.75	"

Jewelers' Flat Nose Plier.

	3½	4	4½	5	inch.
Extra heavy.	\$7.50	8.50	9.50	10.50	per dozen.
Extra Jaws	2.00	2.25	2.50	2.75	"

Jewelers' Round Nose Plier.

	4	4½	inch.
Extra heavy.	\$8.50	9.50	per dozen.
Extra Jaws.....	2.25	2.50	"

Jewelers' Cutting Plier.

	Per dozen.
Jewelers' Cutting Plier, 5 inch.....	\$16.00
Extra Cutting Jaws.....	5.25
" Blades.....	3.00
" Center Screws.....	.30
" Bolts and Nuts.....	.50

Sewing Machine Plier.

	Per dozen.
Sewing Machine Plier.....	\$12.00
Extra Jaws.....	3.00
" Knives.....	1.50
" Bolts and Nuts.....	.45
" Knife Screws.....	.25
" Punches.....	.50

Step and Extension Ladder.—The combined Step and Extension Ladder manufactured by Priestly Express Wagon & Sleigh Company, Grand Rapids, Mich., for whom Horace F. Sise, 114 Chambers street, New York, is agent, an illustration of which appeared in *The Iron Age* February 8, 1894, is sold at a discount of 35 per cent. from the following list:

Length.	Extending to	Each.
4 foot	7 feet	\$1.75
5 "	9 "	2.00
6 "	11 "	2.25
7 "	13 "	2.75
8 "	15 "	3.00
9 "	17 "	3.50
10 "	19 "	4.00
12 "	23 "	4.50

Glass.—Quietness is the prevailing feature in the Glass market, with an absence of regularity in quotations. Prices have gained nothing in strength during the past week, while indications of a weaker market are not wanting. A number of Window Glass factories have closed down since the passage of the tariff bill by the House, and others, it is understood, will close in the near future. Large purchasers are delaying the placing of orders in anticipation of lower prices should the proposed bill become a law, as foreign Glass would

be available for immediate wants, in case enough American Glass was not produced to supply the demand. There are an increased number of Plate Glass factories in operation, though no improvement is shown in prices. A large amount of building is anticipated, as indicated by plans in architects' hands, and a good demand for Plate Glass is expected in the spring. Pittsburgh quotations remain much the same. Single strength, 85 and 10 and 5, and double strength, 85 and 20 per cent. discount. It is reported that Western factories are making low figures on double strength Glass, 90 and 2 per cent. discount for cash being named as price made.

The Hardware Club of New York.

THOSE IN CHARGE of the Hardware Club of New York are making active preparation with a view to the early occupancy of the rooms in the Postal Telegraph Building, and the House Committee especially is busily engaged in making arrangements for putting the rooms in a suitable condition for the use of the club, a matter which is obviously one of not a little difficulty and calling for much care and judgment. The committee is, however, recognized as possessing special qualifications for this work. There has been an unexpected delay in the completion of the building, but a host of mechanics are now at work on it, and it is intimated that possession may be expected in May. The following accessions to the membership of the club have recently been received:

J. W. BARBER,
Boston, Mass.
HILTON C. BROOKS,
Chester, Conn.
GEO. W. ENGLISH,
273 Broadway, New York.
JAMES E. GRANNIS,
President Tradesmen's
National Bank, New York.
JOHN J. HALPIN,
62 Reade street, New York.
CHAS. A. HAMILTON,
President Rogers & Hamilton
Co., New York.
T. H. KITE-POWELL,
37 Park place, New York.
ARTHUR L. MERRIAM,
38 Cortlandt street, New York.
CHAS. RAHT,
35 Pine street, New York.
S. ROSENSTAMM,
81 Fulton street, New York.

Montreal Hardware Dinner.

THE FORTIETH ANNUAL DINNER of the Hardware firms of Crathern & Caverhill, and Caverhill, Learmont & Co., Montreal, was held on Friday evening, 9th inst., at the Balmoral Hotel in that city. Some of the toasts to which appropriate responses were made were "The Queen,"

"The Hardware Trade," "Our Guests," "The Firms of Crathern & Caverhill and Caverhill, Learmont & Co.," "The Caverhill & Learmont Hockey Team" and "The Ladies." The banquet was very much enjoyed by all present.

The New York State Association of Hardware Jobbers.

THE NEW YORK STATE Association of Hardware Jobbers had their annual meeting in Albany on February 8. The association was entertained and dined at the Albany Club, which now occupies the former residence of Erastus Corning, the dinner being given, we are told, in what formerly was the dining room of the old mansion. The hosts on this occasion were the Albany Hardware & Iron Company, of which Charles Turner is president, Mr. Turner acting as toastmaster. The latter gentleman, we are advised, surprised the company by presenting them to the Governor of New York, the Hon. Roswell P. Flower, who dined with them and made a capital speech on "The Resources of the Commonwealth." Webster R. Walkley of Peck, Stow & Wilcox Company and a member of Brooklyn's Common Council, was also an invited guest and spoke on the "Business Man in Politics." Robert McCarthy of Robert McCarthy & Son, Syracuse, and Mr. Lawson, a prominent lawyer of Albany, also addressed the assembly. There were about 30 present, among whom were C. W. Tillinghast of J. M. Warren & Co., Troy; Frederick Barker of Barker, Rose & Gray, Elmira; Hobart Weed of Weed & Co., Buffalo; C. E. Walbridge of Walbridge & Co., Buffalo; Henry Kennedy of Bradford, Kennedy & Sons, Syracuse; Mr. Wright of Wright, Dana & Co., Utica; J. W. Black of Burhans & Black Company, Syracuse; Mr. Murray of Chas. Millar & Son, Utica; Chas. B. Everson of Everson & Co., Syracuse; G. D. Palmer of Palmer, Weaver & Richmond, Rochester, and Mr. Boucher of Hamilton & Matthews, Rochester.

Horace F. Sise.

AMONG the concerns now represented by Horace F. Sise, 114 Chambers street, New York, either as general or Eastern agent or for export, may be mentioned the Putnam Cutlery Company, Putnam, Conn.; A. S. Henn & Co., New Haven, Conn., Can Openers, Chopping Knives, &c.; Sperry Mfg. Company, New Haven, Ind., Rakes, Forks and Broom Handles; Priestly Wagon Company, Grand Rapids, Mich., Sleds, Step and Extension Ladders and Window Screens; Bryan Mfg. Company, Bryan, Ohio, Wheelbarrows; and Taunton Wire Nail Company, Taunton, Mass.

Other goods well known to the trade and handled by him are Meriden Cutting Nippers, Moran's Shoe Knives, Glazier's Plasterers' Hooks, Pell Wagon Gears, Britton's Tool Hafts, &c.

Dull Trade Affecting Salaries.

AN INTERIOR JOBBER writes: Three traveling men met in my store to-day, and in the course of talk something started the subject of salaries. I was not surprised to hear them tell of reductions made at the beginning of the year. One figure made an impression on me. They said the Blank Mfg. Company had made a cut in ———'s salary from \$4500 to \$2500, and he at once resigned his position.

From my standpoint a man must be of immense importance to a house to make a salary of \$4500 a reasonable one. A salesman is out, at the most, eight months, say, or 240 days. His traveling expenses, if he goes to the jobbing trade, range from \$7.50 to \$10 per day. At the minimum figure, for the period named, the expenses amount to \$1800, and for salary and expenses combined \$6300. Now the Blank Mfg. Company are an old, well-known and generally liked house. The merest boy with just wit enough to write an order and quote prices could secure a respectable amount of business for this factory; how much more must this high-priced man influence in order to earn his large salary? I think it is putting it at a low figure to say that, in any ordinary line of manufactured goods, there is not a net profit of over 10 per cent. The Blank company manufacture a large line, and some of their goods do not pay 5 per cent. The late salesman should control a trade of \$50,000, at least, simply to pay his own cost. Does any one believe that any ordinary traveling man, regardless of his house and his goods, could add that amount of sales in this spring of '94 to those the factory would have had without him?

I do not. The first thing to feel the full effect of the new tariff law, in offices, will be salaries. Back in the fifties a man with \$600 a year was comfortably well off, and many excellent managers of factories were looked upon with envy because they were paid \$1000 a year. If our workmen must come down to European wages so must all salaried men, managers, clerks and salesmen.

About Insuring Stock.

A WHOLESALE MERCHANT writes us: We have lately had an extensive fire in our city, and insurance adjusters have been prominent among us for the past two weeks. In the presence of these shrewd experts in the matter of value of stocks and buildings one suddenly discovers that though he may have been insuring all his life, he had not learned two or three very important points. One is that most of us pay out more for insurance than is necessary; that is, we insure beyond the average value of our stocks or buildings.

Take one case that came under my notice to-day. A man bought a business block and lot at auction for \$30,000.

When the building was erected it cost about \$50,000, and when sold was in about as good condition as when built. He supposed he had bought the block at a great bargain; that the actual value of it was \$50,000, and he insured it for that.

When the adjuster sat down with him to talk about the loss, he said: "Let us see, the building and lot were sold at public sale a year ago for \$30,000; now what is the lot worth?" No one would put the value of the lot at less than \$15,000. "Then the building was worth \$15,000." The owner stood aghast. He had insured at \$50,000, but could only collect the actual value, and the insurance expert took the ground that no fairer way of getting at the value could be found than by putting it up at public auction.

Another class of men who were disappointed were those who had been carrying larger insurance on their stocks than they could show by inventory. A man with \$5000 insurance on his stock told me that he supposed if he met with a total loss he would be paid that amount; that if he met with a partial loss his salvage would be deducted from the insurance and he be paid the balance. But it does not work that way.

The question is not "How much insurance had you?" but "How much is your loss?" If that loss equals your insurance you are paid that amount. If it does not you are simply paid the amount of your actual proved loss.

Mentioning this matter to a savings bank officer, he said that his bank always had the insurance assigned to it when a loan was made on a house, and that a majority of people over insured. It was not done to be dishonest, but under the idea that the more insurance placed upon the property the more would be paid in case of fire. But the basis of every insurance adjustment is the value of the property destroyed; any one who insures for more than he can prove the value to have been is throwing away that much money.

Clement Mfg. Company.

CLEMENT MFG. COMPANY, 75 Chambers street, New York, and Northampton, Mass., have for many years confined themselves almost exclusively to manufacturing high grade Steel Blades and solid Steel Blanks used by silversmiths and plated ware manufacturers in their sterling silver, pearl, ivory and plated hollow handle Table Cutlery. They determined during the past year to enlarge the scope of their business, and since then have fitted up to produce a full line of Stag, Rubber, Celluloid, Ivory and Pearl Handle Goods in Desert, Medium and Table Knives, Carving Knives and Forks, Table Steels, &c. They announce that all goods offered will be free from imperfections as to quality of materials, workmanship and finish, and court critical inspection by intending purchasers.

The line will include a variety of new styles, supplementary to those

now regularly known to the trade. A large assortment of standard patterns are now ready and others are being added as promptly as the making of new dies will permit. The company have for the present adopted the plan of issuing illustrated sheets, 8 x 10 inches in size, giving numbers sizes, &c., which later will be replaced by a catalogue in book form. Those who desire prices or further information can address W. M. Caldwell, who has charge of the marketing of the goods, at the New York address given above.

J. B. Addis & Sons' Carving Tools.

THE LINE of Wood Carvers' Tools made by J. B. Addis & Sons, Sheffield, England, are put on the market in this country by White, Van Glahn & Co., 15, 16 and 17 Chatham Square, New York, who with their predecessors, W. N. Seymour & Co., have acted as sole agents for the United States for more than 50 years. We are advised that particular attention has always been given to the quality of steel used and to the finish of the goods, experienced and high class workmen being employed, most of whom have been with J. B. Addis & Sons for many years, thus securing the recognized high quality of the goods. This is a necessarily high priced line of goods, but we are advised by White, Van Glahn & Co., that they have succeeded in making arrangements by which they can offer the Tools at prices which will command the attention of the trade, and they are accordingly pushing the goods more vigorously than heretofore and are anticipating a largely increased sale.

Shot Gun Exhibit.

HENRY C. SQUIRES & SON, at their new address, 20 Cortlandt street, New York, will in a few days receive the entire exhibit of Shot Guns recently displayed at the Chicago exposition by W. W. Greener, London and Birmingham, England. They already have a portion of the exhibit, the balance being still in the possession of the customs authorities. Some of the Guns shown are exquisitely made and safely representative of this class of firearms. The firm have for gratuitous distribution an illustrated pamphlet of this exhibit reproduced from the official catalogue of the exposition.

Many of the Guns are shown in handsome individual cases with implements complete. There are Shot Guns from 36 gauge double barreled to single barrel Harpoon Guns of 1½-inch bore. Express Rifles for elephant shooting of four bore gauge to Rook Rifles which are about equivalent to our 38 caliber. In cases including implements highly finished, with handles of ivory, metal parts gold or nickel plated, they vary in price from \$400 to \$600. Ejector hammerless Guns, latest models, are shown, valued at from \$250 to \$500 each. The higher grades of these are engraved and inlaid with gold. Others are finely mounted with Italian walnut stocks, checked and carved in oak leaves and various elegant designs. The original case used at the fair being too large to transport conveniently, the Guns will be displayed in the case used at Philadelphia in 1876 for a similar purpose. This house is also showing a fine line of fishing tackle, including split bamboo rods weighing but 3 ounces and aluminum reels of 2 ounces.

Iron Clad Mfg. Company's Catalogue.

IRON CLAD MFG COMPANY, 22-24 Cliff street, New York, have issued a complete catalogue of staple goods and specialties manufactured by them, 9 x 12 inches in size, bound in cloth and containing 111 pages. Many new specialties not found in their last general catalogue are illustrated and listed in this one. They have departed from their usual custom in this catalogue, for instead of designating some of the articles by capacity or dimensions, each article has been given a specific number by which it will hereafter be known to the company. A full page view of their factories in Brooklyn is given near the front of the book and they are referred to as covering an area of 139,000 square feet. The goods are conveniently divided into departments, with illustrations and list prices, as follows: Iron Clad Enameled Iron Ware, Milk Cans, Dairy Specialties, Galvanized Ware, Retinned Steel Ware, Range Boilers, Expansion Tanks and Boiler Stands, and miscellaneous goods. Sufficient space is given each illustration and its accompanying sizes and lists to allow of ready reference, and the entire book is admirably arranged and reflects credit upon the company.

Haydenville Mfg. Co.'s Catalogue.

HAYDENVILLE MFG. COMPANY, 73 Beekman street, New York, and Haydenville, Mass.: Plumbers' Brass Work, Materials and Sanitary Specialties. The company issue a miniature catalogue of 560 pages, well bound and accompanied by a discount sheet which is designated as No. 80. The numbers given to goods are identical with those in their former and larger volume so as to avoid any confusion. It furnishes another indication of the tendency to break away from large and cumbersome catalogues, which are inconvenient to handle and to carry. But little is sacrificed in the clearness of cuts, lists or printed matter, while it furnishes a catalogue unique in size and admirably fitted for all the requirements of the trade. Preceding the general index is a short index giving the pages between which the various lines may be found. These lines include Ground Key Work, Compression Work, Hardware Goods, Self-Closing Work, Peck's Improved Work, Miscellaneous Brass Goods, Pumps and Hydrants, Sanitary Specialties, Cast Iron Soil Pipe and Fittings, Tools and Steam Work. Special attention is given to Wash Out and Syphon Closets, from the best to the cheapest, also to Open Lavatory Work.

W. H. SKINNER, whose headquarters are at Chicago, entered into the employ of the Forehand Arms Company, Worcester, Mass., January 1. He will be their traveling representative for the especial purpose of introducing their new Hammerless Double Gun. Mr. Skinner has formerly been connected with the Peters Cartridge Company and other well-known houses, and has a wide acquaintance in the trade. He is also known as an exceptionally fine shot, being one of the best trap shots in the country. At the Chicago Fair he was the representative of the Burgess Gun Company and had charge of their exhibit. Since his engagement with the Forehand Arms Company he has completed an extensive trip through the South, meeting with good success. He is about starting from Chicago on a trip through the West and Northwest, visiting only the large trade.

Arrangement of Stores.

J. CURLEY & BROTHER.

Part II.

IN PART I a partial description was given of the arrangement of this finely equipped establishment, some suggestions being also given in regard to the care and sale of Cutlery. The concluding chapter of our descriptive article relates more to the details of the store, numerous illustrations being presented of the ad-

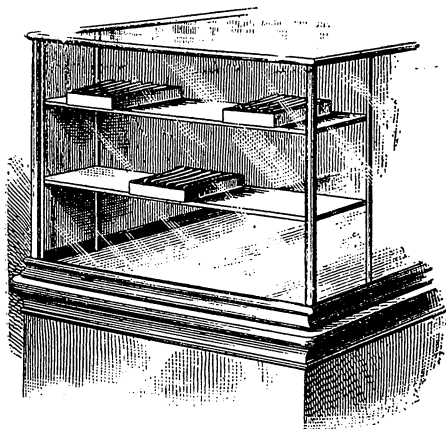


Fig. 820.—Shelves in Showcases.

mirable methods adopted for the display and accommodation of the extensive line of goods carried.

By reference to the floor plan, Fig. 810, an idea can be formed of the variety of lines of goods which go to make up the stock. A full assortment of sizes, grades and styles are kept in each line; and it requires a number of different arrangements to display these goods to advantage in the showcases.

In Figs 820, 821, 822 and 823 are shown various styles of racks for accommodating goods, the manner in

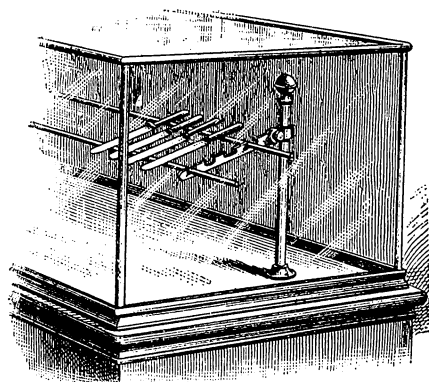


Fig. 821.—Rack in Showcase.

which the goods are arranged being indicated. In Fig. 820 the shelves are adjustable, the four wooden uprights having holes in which screw eyes are fastened, upon which the shelves rest. These shelves are used for Razors in boxes, Nut Picks, Shaving Brushes, &c. The rack represented in Fig. 821 can be raised or lowered and the rods placed at different distances apart. The uprights in Fig. 822 are also ad-

justable, the points of the Carvers and Forks resting against an angle-shaped piece of black walnut. The stationary racks, shown in Fig. 823, are of different heights, allowing goods to be

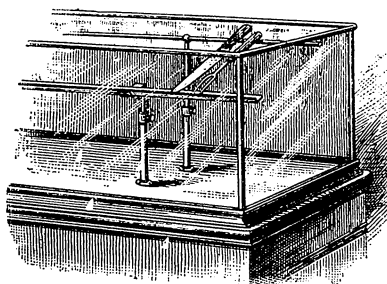


Fig. 822.—Rack for Carvers.

arranged one above the other. In this manner goods in plush cases, such as fancy Carvers, Manicure Sets, Razors in sets, &c., are shown. The racks are made of brass, nickel plated.

No better shelf box for sampling and containing retail stock of Pocket Knives has been found than that shown in Fig. 824. The wire that holds the sample in place is arranged with a spring inside, something like a Choker Mouse Trap. For sampling Pocket Knives in the wholesale department

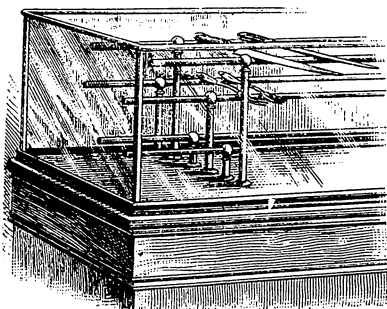


Fig. 823.—Racks for Cook Knives, &c.

dummy boxes are used, made of blocks of wood covered with paper, three boxes being fastened together, as in Fig. 825. The sample is fastened in place with a string and with a label under the sample the package resembles a package of Knives just imported. Small cleats are fastened to the shelves

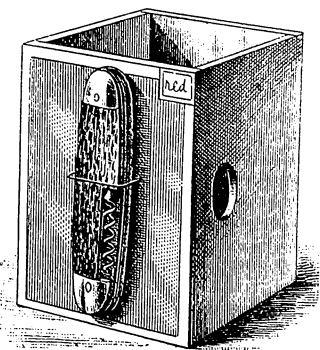


Fig. 824.—Boxes in Retail Department.

at a proper distance from the front to prevent the packages from getting out of line. The stock is not kept on the shelves with the samples, and the sam-

ples are not sold even to fill out $\frac{1}{2}$ or $\frac{1}{4}$ of a dozen. This insures all goods being sent out wrapped in the original papers, thus presenting a neat and clean appearance. It is often the case also that a customer desires to see the style of a Knife, even if there are none in stock. Samples of Razors are tied on wooden boxes with slide covers, Fig. 826, the boxes being of the same size and appearance as the original package. When the stock is exhausted the Razor is put inside the empty box.

Samples and stock are kept in close proximity, both in the retail and wholesale departments. This fact is illustrated in Figs. 827 and 828, which represent the space under the counters at

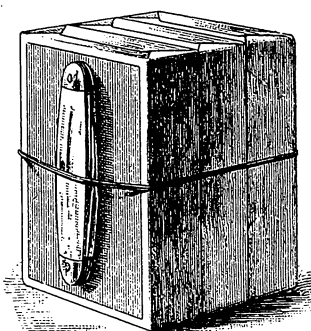


Fig. 825.—Samples in Wholesale Department.

the left of the store, the former showing the stock of Table Knives and the latter that of Razor Stropps. In the wholesale department prices are marked on the original package and also on the dummy sample package. In the retail department prices are marked on sample boxes, Fig. 824, and also in a price book, of which part

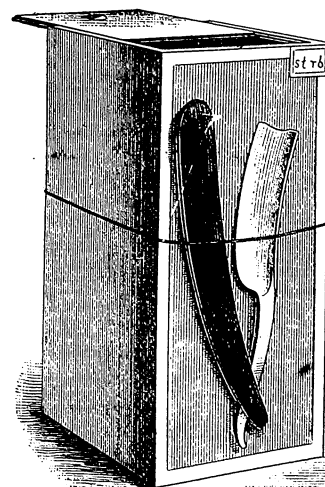


Fig. 826.—Wholesale Razor Samples.

of a page is reproduced in Fig. 829. A cut of the Knife is given over each column, under which is the number, description and price of the various finishes in which it is kept. This book precludes any mistake being made in the price of a Knife or its number, should the Knife become separated from its box, and also affords a complete record of all Knives that have ever been kept, information which

is found very useful for reference. The Pocket Knives in the showcases are kept on steps and shelves and are neither in boxes nor marked, the book being depended upon to supply the price. Goods are sold at one price only and the book is often called upon to settle the question of how much a

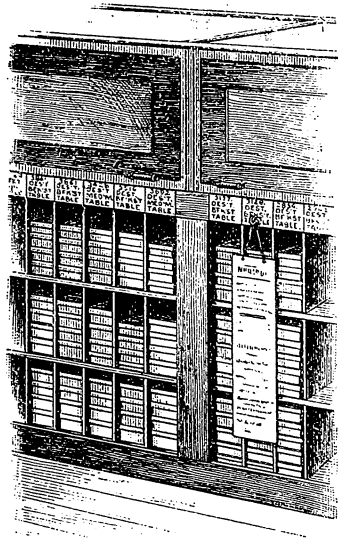


Fig. 827.—Duplicate Stock of Knives.

customer paid for his last Knife. For Table Cutlery the price-lists are on cards, a portion of one being shown in Fig. 830. The price of an entire line of goods is given on each line. For instance, on the first line are given the prices of 1462 Rubber Flush Bolster, in Dessert, Medium and Table Knives only; also, of 7, 8, 9 and 10-inch Carvers, Game Carvers and 8-inch Steels.

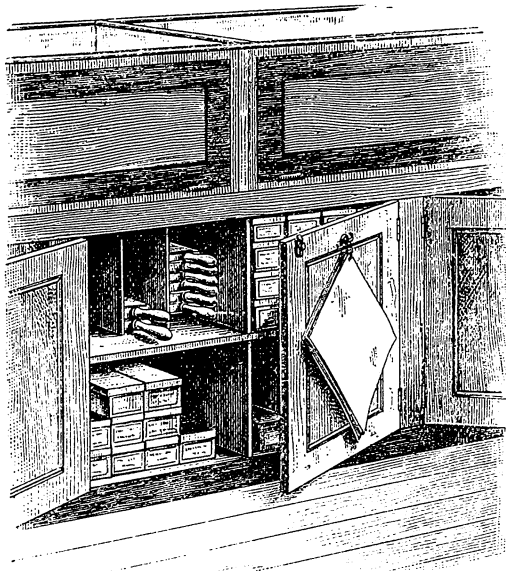


Fig. 828.—Duplicate Stock of Razor Strops.

The other goods throughout the store are priced in a similar manner, the price-lists being arranged especially for each line. The stairway near the center of the store leads to the basement, which is fitted up with shelves for stock and sample cases of goods, as shown in Fig.

831. A noticeable feature in the arrangement of the basement is a wire railing 6 feet high running in front of the shelving and preventing access to the stock, except by those who have a key to the doors. The railing is represented by dotted lines in Fig. 831, and a detailed view of it is given in Fig. 832. In this inclosure goods are gotten out on orders, the different packages being laid on the shelf fastened to the railing until the order is completed. The goods are then placed on a movable table and taken to the packing table. An incomplete order may thus be left without fear of its being disturbed by outside parties and the liability of having goods within the railing stolen is also obviated.

The sub-basement is used for storing goods and also for parts of goods used for manufacturing, as parts of Razor Strops, &c. Here are kept pasteboard boxes, mailing cases, unused showcases, &c. Fig. 833 gives a view of shelving in the sub basement used to keep books and papers which may be needed for reference.

It has been found that ivory made up in America is better seasoned than English ivory and is not so apt to crack. Extreme heat or extreme cold cracks ivory handles and for this reason ivory handled goods are kept near the floor where the temperature is more normal than higher up.

In the management of this exceptionally well arranged store there is a marked absence of dictatorial fault finding or magnifying of errors. Employees are supposed to sufficiently regret mistakes to use every precaution against their occurring again. As opportunity presents additional safe-

pay for goods if they suit and give satisfaction. It is necessary for a salesman to know what he is selling, and to sell only the best when the best is called for. It will not do for the clerk




		
3 inch. No. 868—14398. Pearl. Price 2.25	3 inch. No. 872—14394. Ivory. Price .65	3 inch. No. 876—14392. Stag. Price .65
No name plate. No. 869—14395. Price	No. 873—14393. Price	No. 877—14391. Price
With name plate. 3 3/4 inch. No. 870—14419. Pearl. Price 2.50	3 3/4 inch. No. 874—14417. Ivory. Price .90	3 3/4 inch. No. 878—14270. Stag. Price .90
No. 871—14418. Price	No name plate. No. 875—14416. Price	No. 879—14415. Price
No. 863—14372. Pearl. Price 2.00		

Fig. 829.—Retail Price-List.

to say that a certain Knife is the best, and when his attention is called to something better to excuse himself by saying, "Oh, that costs more." The confidence of customers, it is believed by this firm, can be secured if they find that things prove as represented. In marking goods a certain percentage is added to the cost in each line. While goods for retail are not marked at exorbitant prices, it is believed that they should bear a profit somewhat in proportion to the time required in selling them. A person buying a Pocket Knife, often consumes as much time as is required to sell a bill of Table Cutlery at wholesale amounting to \$50.00.

A Kansas Wire Plant.

THE CONSOLIDATED BARB WIRE COMPANY of Lawrence, Kan., have made extensive improvements in their manufacturing facilities during the past year. Their plant is now so large that it would be very creditable even if located in a much older section of the country. The business was begun in a small way in 1878 by A. Henley, with very crude and imperfect machinery. Progress was steadily made from year to year, and the works are now as follows: Wire mill department, 175 x 100 feet; Barb Wire department, 175 x 60 feet; warehouse, 100 x 90 feet; Wire Nail department, 175 x 50 feet; wood working department, for the manufacture of Wire spools and Nail kegs, 175 x 32 feet, with an l 60 x 50 feet; repair department, 48 x 32 feet; offices, two rooms, 20 x 20 feet and 20 x 12 feet. The machinery is run by water power, while all the buildings in which heat is needed are heated by steam. The annual capacity of the Wire mill is 17,000 tons of Plain Wire; Barb

guards are devised, which are calculated to overcome the difficulties experienced. The most friendly relations exist between the firm and their employees, resulting in long service and few changes among the clerks. It has been found that customers do not usually complain of the price they

Wire department, 12,000 tons; and Wire Nail department, 50,000 kegs. All the departments are connected conveniently and the factory is regarded as very well arranged. The location of this establishment was for the first time properly tested during the past year. When other manufacturers in the same line were securing but little business this company were able to report an exceedingly good trade, which was largely owing to their location practically in the center of a vast agricultural section. The company's products are marketed under the "Owl Brand." The president of the company is A. Henley, the founder of the business. J. D. Bowersock is vice-president and J. A. Henley is secretary.

Hardware in South Africa.

LETTER FROM
POLHEMUS LYON,

Our Special Foreign Representative.

DURBAN, NATAL, December 16, 1893.

The colony of Natal has had hard lines for a year past, since the South African Republic will not allow its railway to enter their territory, so there is a long break from the Natal

by the general merchants who have Hardware departments. One of these general merchants has 60 branch houses, which of itself means a great deal of business, and, in fact, almost all the houses have branches located at different centers.

Although Natal has nearly 1000 miles of railroad, an immense amount of freight is still carried by bullock wagons, who enter into competition with the railway. It is interesting to call on a general merchant of a morning, threading my way through endless bullock teams; that is to say it seems endless, for I have counted 20 bullocks to one cart, and watched them loading up a varied assortment of merchandise, 3 to 4 tons on a wagon, which has, perhaps, 500 or 600 miles to travel before it is unloaded.

Until lately the Dutchman coming to town to purchase often insists upon paying for each article as he buys it and when it is safely lodged on the wagon will select something else, thus tediously building up a bill of from \$1500 to \$2500. Of course this is gradually being superseded by extension

their ambition toward the needs of civilization, and given them opportunities for profit as well.

One feature of colonial business would prove a great boon to our Amer-

NUMBER & HANDLE	TABLE CUTLERY			CARVERS				STEELS		
	DESS	MED	TABLE	7 INCH	8 INCH	9 INCH	10 INCH	GAME	7 INCH	8 INCH
1462 RUBBER FLUSH BOL KNIVES ONLY.	2.50	2.75	2.75	1.45	1.50	1.90	2.20	1.50		.50
1462 RUBBER FLUSH BOL KNIVES & FIS SET OF 6 EACH.	2.35	2.60	2.60							
1486 RUBBER HOLLOW BOL KNIVES ONLY.	2.75	3.00	3.00	1.65	1.65	2.00	2.00	1.65		.55
1486 RUBBER HOLLOW BOL KNIVES & FIS SET OF 6 EACH.	2.50	2.75	2.75							
1488 CELLULOID HOL BOL KNIVES ONLY.	4.00	4.50	4.50		2.10	2.45	2.75	2.10		.75
1489 GRAIN CELLULOID HOLLOW BOLSTER.	4.50	5.00	5.00	2.45	2.75	3.25		3.25		.75
1356 IVORY HANDLES.	8.00	10.00	10.50	4.10	5.00	5.50	6.00	5.00	1.35	1.50
2036 PEARL HANDLES.	11.50	16.00	20.60		7.50	7.70		7.50		1.90

Fig. 830.—Retail Price-List.

Railway terminus to Johannesburg, to be filled in by transport wagons.

Each of the South African ports contends for the largest share of Transvaal business as the *sumum bonum* of their ambition, while the Dutch Republic hold back and put every obstacle in the path, for they fear progress will prove a pestilence which will overcome their power; however, they cannot successfully continue this policy, since the larger proportion of people are very decidedly English; and what makes it worse for Natal is that the Cape Colony Railroad was admitted into the territory some time ago. Now the Republic is pledged to allow the Natal road access during the coming year.

Natal has only about 75,000 white people, but through enacting a 5 per cent. customs duty, against 12½ per cent. of the Cape Colony, had, until the railroad advantage of the latter, an actual two-thirds of the Transvaal business, which is the largest business in South Africa.

There are five Hardware houses in Durban, three of whom carry very large stocks in addition to that carried

of the railways and increase of the commercial traveling force. These travelers make their trip with four horses and a driver in a high two-wheeled cart, with perhaps 1000 pounds of samples, including the proverbial "needle to an anchor" assortment, and travel right up and down the country, going some thousands of miles in a trip. They do not have the frost and snow of northern latitudes to contend with, but have pretty serious times in fording rivers and climbing out of mud holes.

Within the last two years there has been a greatly increased demand for American Agricultural Implements, and the opportunity for development in this line is practically unlimited. Though in figuring the demand of South Africa we are apt to attach very little importance to what the 4,000,000 black people consume, it is true that they do buy certain lines of American Farming Tools quite freely; and there are now quite a large number of them who are well to do, not only in land and cattle, but in actual coin. Association with the whites has stirred up

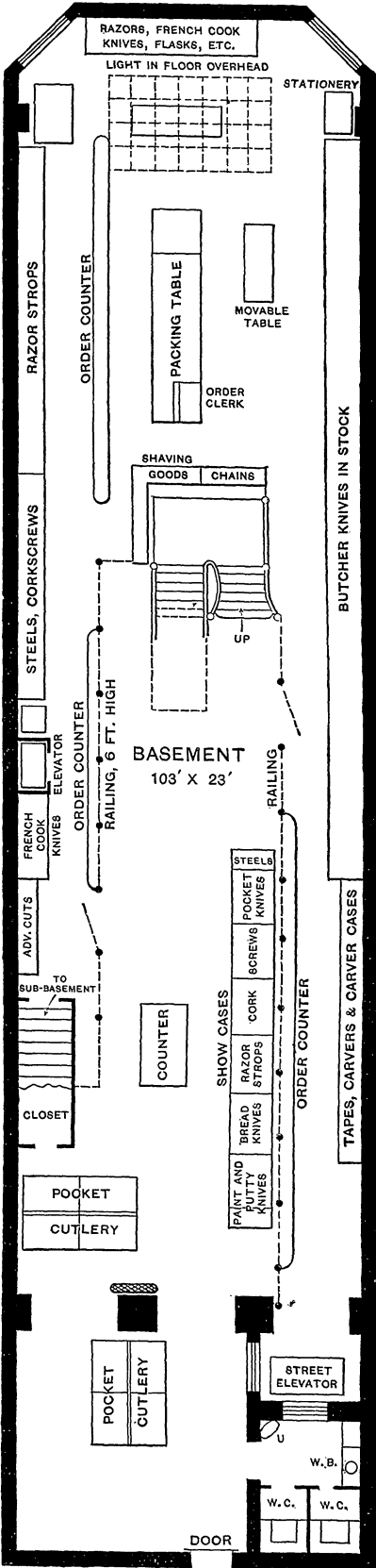


Fig. 831.—Plan of Basement.

ican clerks, and that is the usual closing of business at 5 o'clock, except on Saturdays, when the wholesale houses close at 1 and the retail at 2 o'clock, all the year around. The result of this is that everybody goes in for out of door

sports, to their great gain in health and stamina; and though Natal is sub-tropical, this may account for the fact that it is a very pushing, energetic little colony, and is sure to make a commercial name for itself.

Polhemus Lyon

Bicycle Notes.

"THE YELLOW FELLOW," E. C. Stearns & Co.'s spokesman, calls the attention of dealers to the fact that there is nothing that is sold under the influence of brisker competition than the Bicycle, and emphasizes the necessity of the dealers' being intimately acquainted with the points and details of the machine they favor, in order that customers may be led up to a true appreciation of its merits.

Introducing a line of Bicycles and sundries into a retail stock helps to lift the business out of a rut, gives a merchant a paying line to interest himself in, and acquaints him with young men who in time will become heads of families and profitable customers of some one. By fair treatment there is no reason why the merchant who sells these wheels should not retain them as customers for years.

Treating the Bicycle trade from Hardware merchants' standpoint, our Canadian contemporary, *Hardware*, remarks that there is money in handling the Bicycle the merchant may be assured of from the fact that not only are Hardwaremen commencing to handle them, but dry goods men and fancy goods dealers are all accepting agencies. After referring to the care which should be taken in the style and grade of wheel selected, another element of success in this line is touched upon as follows:

The merchant who is a wheelman himself is more likely to make a success of the business, as he will come more in contact with the local wheelman. Then such a one will be more likely to take an interest in anything appertaining to the pastime. He will doubtless be called upon to contribute something to the prize list for the local bicycle races. Do not be backward in responding to such a request. It is one of the best advertising investments you can make. There is an old fisherman's proverb which reads: "Many a man who cast a sprat caught a mackerel."

INDIANA BICYCLE COMPANY, Indianapolis, Ind., are sending out to the trade with their compliments a neat two-bladed pocket knife, which is utilized to call attention to their business as manufacturers of the Waverley Bicycles, an advertisement of which appears in this issue.

CENTRAL CYCLE MFG. COMPANY, Indianapolis, Ind., remark in a circular to the trade that until this year they have manufactured Bicycles for the jobbing trade only, but that now they will sell direct to the retail dealer, giving restricted territory, and will make prices which will allow the dealer to compete with the jobber. The com-

pany claim for their machines superior quality, design, construction and light weight.

THE MARBLE CYCLE MFG. COMPANY, Plymouth, Ind., are offering the fol-

Model 19, weighing 32 pounds, stripped 29 pounds, listing \$115; Model 20, ladies' light roadster, weighing 32 pounds, listing \$115; Model 21, convertible light weight, weighing 32½ pounds, listing \$115; Model 10, light

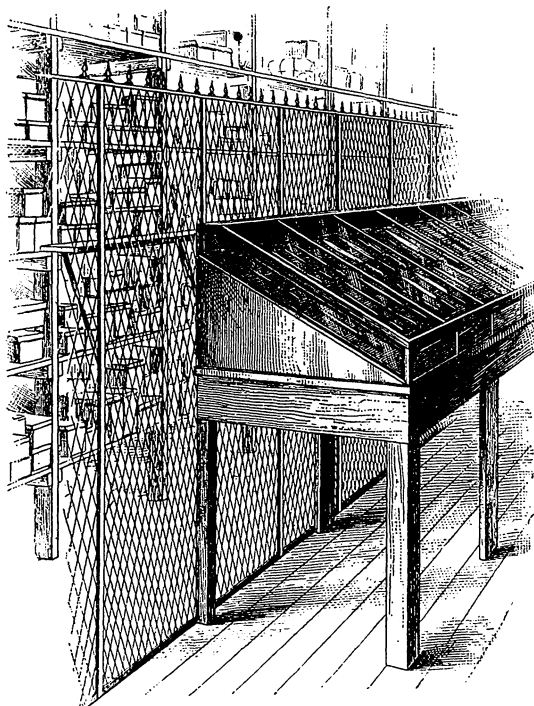


Fig. 832.—Stock Room in Basement.

lowing Smalley Bicycles: Road racer, weighing 29 pounds with steel rims, or with wooden rims equipped for racing 25 pounds, listing \$125; light roadster, weighing, all on, 34 pounds, listing \$125; track racer, weighing from 20 to 24 pounds, listing \$150, and ladies'

roadster, weighing 31 pounds, listing \$90; Model 11, listing with pneumatic tires, \$90, and with cushion tires, \$85; Model 13, ladies', listing with pneumatic tires, \$90 and with cushion tires, \$85; Model 15, convertible, listing with pneumatic tires, \$90, and with cushion

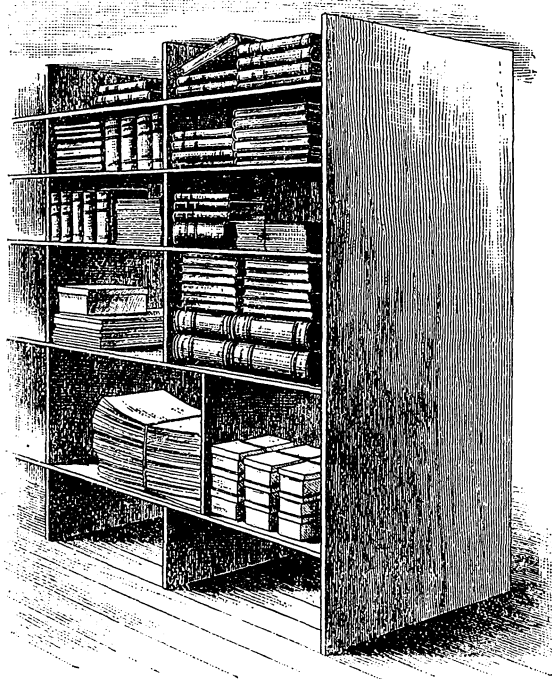


Fig. 833.—Superannuated Books and Papers.

wheel, weighing from 30 to 32 pounds all on, or with wooden rims from 26 to 28 pounds, listing \$125.

JOHN P. LOVELL ARMS COMPANY, Boston Mass., are showing a line of Lovell Diamond Bicycles, including Model 17, racer, weighing 19½ pounds, listing \$125; Model 18, light roadster or road racer, weighing 25½ pounds, listing \$115;

Model 19, weighing 32 pounds, stripped 29 pounds, listing \$115; Model 20, ladies' light roadster, weighing 32 pounds, listing \$115; Model 21, convertible light weight, weighing 32½ pounds, listing \$115; Model 10, light

Trade Items.

CHARLES J. HEALY has leased the premises 121 Chambers street, running through to 103 Reade street, of which he will take possession as soon as necessary repairs are made. The store is about 250 feet long, with good light, and will afford every facility for his increased business.

THE F. L. GAYLORD COMPANY, Ansonia, Conn., manufacturers of heavy and light Brass, Bronze and Composition Castings, announce that they are now represented in New York City by Thos. L. Fowler & Co., with offices at 55 Fulton street.

THE TOPLIFF & ELY COMPANY, Elyria, Ohio, are manufacturing the Buck "I" Pruners, an illustration of which appears in their advertisement in this issue. These Pruners are made in two sizes, Nos. 1 and 2, each being 26 inches long. They are referred to as especially valuable in a young orchard, the No. 1 cutting limbs 1½ inches in diameter and the No. 2 cutting limbs 2 inches in diameter.

THE OSBORN HARDWARE & TOOL COMPANY have been organized at San Francisco, Cal. They will conduct a general Hardware and Tool business at 414 Market street in that city. The capital stock of the company is \$50,000. The officers are as follows: Frank F. Osborn, president and manager; Warren S. Perkins, vice-president and secretary, and Edwin Van Every, treasurer. Mr. Osborn was for 21 years an active member of the late firm of Osborn & Alexander, which was dissolved several months since. He will visit the Eastern States during February for the purpose of purchasing goods and arranging for agencies.

IN THE ILLUSTRATED DESCRIPTION of the Crude Oil Burner which appeared in *The Iron Age* February 8, 1894, the Foster Stove Company were erroneously referred to as located at Findlay instead of at Ironton, Ohio, as it should have been.

POTTSTOWN IRON COMPANY, Pottstown, Pa., are sending out convenient folders containing a few samples showing the pattern and finish of Pottstown Anvil brand Cut Nails. On the opposite page is given the national list of extras for Cut Nails in fair assortment.

F. J. ANDRE, Wauseon, Ohio, in his advertisement in this issue illustrates his Tightener for wire fences and alludes to its advantages.

IT IS ANNOUNCED that on and after February 5 the business of manufacturing sheet metal goods heretofore conducted by the partnership of Matthews Mfg. Company, Worcester, Mass., will be continued under the same style by a corporation duly organized according to the laws of the State of Massachusetts. The directors of the corporation are as follows: F. E. Reed, president, John Reed, treasurer, and A. T. Matthews, general manager.

WINCHESTER REPEATING ARMS COMPANY, 312 Broadway, have dressed their front show window attractively with a number of Shells and Cartridges, such as are used largely in the navy in connection with rapid fire guns, in size from 1-pounders up. Some are pointed conical steel Shells, polished bright and capable of piercing armor, while other types are small common Shells, conical in shape, with blunt or flat points. These are painted red. The Shells are shown both as affixed to the brass Cartridge Shell and detached. Some have a section sawed out, so that the interior mechanism can be seen.

The difference is striking between these elaborately turned and polished parts of brass and steel and the crude round cannon balls of a few years ago.

THE G. S. FOOS COMPANY, Springfield, Ohio, announce that they have sold their good will, stock of merchandise and entire equipment of patents, patterns, machinery, tools, fixtures, &c., to the Ohio Wringer & Lawn Mower Company, who will hereafter conduct the business heretofore controlled by the former company.

M. D. HALPIN has established himself at 62 Reade street, New York, and will deal in Builders' Hardware, buying from the manufacturers. A leading feature of his business will be to take plans and specifications from architects and builders and make estimates for the Hardware required. We are advised he has been in the employ of Yale & Towne Mfg. Company for the past eight years, and was with A. G. Newman, 1180 Broadway, the five years preceding. He has been visiting architects throughout the city for the last 12 or 15 years. In connection

with Builders' Hardware, later on, he will have some Hardware specialties to introduce among architects and builders, to whom he will confine himself almost exclusively.

THE ATTENTION OF THE TRADE is directed to the advertisement in this issue in which Cary Mfg. Company, 5 to 9 Elm street, New York, illustrate their Box Strapping and the convenient manner in which it is put on the market. At the same time they call attention to the injunction which they have obtained restraining the making and selling of Box Straps in contravention of their patent.

Price-Lists, Circulars, &c.

THE G. M. SHIRK MFG. CO., 112 and 114 Lake street, Chicago: Illustrated catalogue and price-list for 1894 of North Star Refrigerators. This is a fine catalogue of 40 pages. It opens with a cut of the factory at Peru, Ind., then follows an enumeration of the points of excellence on which a medal and diploma were

Prize Competition No. 28.

CLOSING FEBRUARY 17, 1894.

Subject: Bicycles in the Retail Hardware Store.

In this competition the sale of Bicycle accessories, such as Lamps, Bells, Tools, Tool Bags, Pumps, Lubricators, &c., is included in connection with Bicycles.

There is an evident tendency toward a largely increased sale of Bicycles through the Hardware trade, and this competition is announced for the purpose of obtaining suggestions as to the methods by which this line of business can most successfully be carried on by the retail Hardware merchant.

Those discussing the subject are free to treat it as they think best, but the following points are suggested as deserving attention:

- The feasibility and desirability of selling Bicycles and Bicycle Supplies in the retail Hardware store;
- The difficulties in the way and how they may be overcome;
- The extent of the assortment which the Hardwareman should carry;
- Whether he should confine himself to one line of Wheels;
- The best methods of stimulating the sale of these goods; and
- Whether it is necessary or desirable to have a repair department and how it may best be conducted.

The following prizes will be awarded:

First Prize,	-	-	-	\$25.00.
Second Prize,	-	-	-	15.00.
Third Prize,	-	-	-	10.00.

This subject is open to all.

In its discussion it is desirable that reference to particular manufacturers or machines be omitted.

We shall have the privilege of publishing any of the contributions received.

Contributions are to be received not later than February 17, 1894. They should be addressed as follows:

DAVID WILLIAMS,

96-102 Reade Street,

Prize Competition No. 28.

New York.

granted by the Columbian Exposition, after which a number of cogent reasons are given why the reader should buy the North Star Refrigerator. Next follows a sectional cut showing the plan of construction and circulating system, after which 27 pages are devoted to illustrations, descriptions and prices of the numerous styles of Refrigerators manufactured by the company, covering all kinds from those furnished at moderate cost up to very elaborate and expensive sideboard constructions. All are made of kiln dried hardwood. The new lock brought out this season has a drop handle which lifts the latch when it is raised. This is effected by a ratchet gear connecting the handle with the latch. It is operated so easily that the door can be opened by the foot as well as the hand. The corner posts of these Refrigerators are extended beyond the frame work to form the feet, avoiding the use of separate blocks. They are inclosed with the usual trimming, and are thus ornamental as well as strong. Casters are held in place by a steel spring and cannot drop out. The trap is of malleable iron, automatically returning to position after being turned down for cleaning. Insulation is secured partly by dead air spaces and partly by granulated cork filling, which does not pack and will not absorb moisture.

FAY MFG. COMPANY, Elyria, Ohio: Tricycles and invalid chairs. Seven styles of Fairy Tricycles for invalids and cripples are illustrated, adapted to those who require different modes of propulsion. Modifications are also made in these machines to meet special requirements.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Fishing Tackle. The book contains 65 pages, and illustrates, with list prices, Reels, Rods, Rod Cases, Rod Mountings, Flies, Leaders, Trolling Spoons, Artificial Baits, Hooks, Lines, Floats, Sinkers, Fish Cleaners, Bait Boxes, Minnow Pails, Baskets, Nets, Fishing and Hunting Knives, Tents, &c.

E. C. MEACHAM ARMS COMPANY, St. Louis, Mo.: Catalogue of Sporting goods. The book contains 112 pages, and is known as catalogue No. 564. Another catalogue for dealers only is devoted to Bicycles.

THE OHIO WRINGER & LAWN MOWER COMPANY, succeeding the G. S. Foos Company, Springfield, Ohio: Wringers, Mowers, &c. An illustrated catalogue shows the following Wringers: New Champion, Ohio Acme No. 1, Ohio No. 2, Buckeye, Ideal, Perfect, Empress; also Sunbeam, Florence, Favorite and Standard Lawn Mowers, and Sack Holder Truck.

H. L. JUDD & Co., 87-89 Chambers street, New York: Lamps. A temporary catalogue of Lamps. No. 26, illustrates an extended line of Banquet and Piano Lamps in a variety of finishes and styles.

E. M. RICHARDSON, Waltham, Mass.: Sash Weights, Blind Fasteners, &c. Circulars illustrate Sash Weights and Shedd's Steel Spring Wire Blind Fasteners for brick buildings. It is stated that these Fasteners do not interfere with outside screens.

SYRACUSE SUPPLY COMPANY, Syracuse, N. Y.: Tools and manufacturers' supplies. Catalogue No. 2 contains 240 pages, bound in flexible cloth covers, and illustrates, with descriptions and prices, Tools, supplies and machinery for machinists, engineers, blacksmiths, model makers, foundries, molders, inventors, amateurs and manufacturers. It is a convenient, comprehensive and well arranged volume.

RANDOLPH & CLOWES, Waterbury, Conn.: Copper Range Boilers. A

pamphlet is devoted to an explanation of the construction and utility of Brown's Patent Seamless Copper House Boilers. Colored illustrations show the manner in which the Boilers are made.

THE BRIDGEPORT GUN IMPLEMENT COMPANY, 313-315 Broadway, New York: Bicycle sundries. Their complete price-list of Bicycle sundries illustrates Cyclometer, Whistles, Calls, Lubricants, Oils, Oilers, Screw Drivers, &c.

It Is Reported—

That on January 29 the Hardware store of H. Lawrence, Rosamond, Ill., was destroyed by fire.

That the firm of Arnold, Thayer & Co., dealers in Hardware, Implements, &c., Chenoa, Ill., have been dissolved. William and Oscar Arnold have succeeded to the Implement part of the business, while C. E. Thayer will continue the Hardware department under his own name.

That Teel Bros.' Hardware store at Terre Haute, Ind., was robbed on January 27. A large quantity of Knives and Revolvers were carried away.

That E. J. Soper of the late firm of Alberty & Soper, Hardware dealers, Perry, N. Y., will after April 1 be connected with the Deering Harvester Company as traveling man.

That the Mansfield Hardware & Furniture Company have been incorporated at Mansfield, Ill., with a capital stock of \$10,000. The incorporators are C. F. Mansfield, M. B. Mansfield and William Clemens.

That the Hardware firm of Hanke & Scharf, Newton, Iowa, have been dissolved by mutual consent. Philip Scharf will continue the business, Mr. Hanke retiring. The latter will take to the road for a wholesale house.

That Gus Haegg and Emil Kuhlen have bought out the Hardware firm of Clark & McKinney, Rockford, Ill., and will take possession of the business on March 1. Mr. Haegg has been in the employ of the firm and is well posted in the business.

That Albert Bauman has bought a half interest in Henry Ammon's Hardware store at Peotone, Ill.

That Klove & Mosey have bought out Hanson's Hardware store, at Ottawa, Ill., and will remove the stock to their own establishment.

That Charles J. Boesel of New Bremen, Ohio, has purchased E. P. Bennington's Hardware store at Galveston, Cass County, Ind.

That the Stoddard Hardware Company, Minneapolis, Minn., have been incorporated. The capital stock has been fixed at \$50,000. Fred. L. Stoddard, Geo. P. Derickson and William B. Millar are the incorporators of the company.

That Samuel M. Wilkinson, formerly of Mansfield, Ohio, and later engaged in silver mining in Mexico, and Miles J. Watson, late of the firm of Godley & Watson of Mansfield, have entered into partnership under the firm name of Wilkinson & Watson, and will soon open a new Hardware store in Mansfield.

That J. A. Gleason has disposed of his Hardware stock at Tipton, Ind., to George Shortle.

That Andrew Mueller, North Milwaukee, Wis., opened his new Hardware and Stove store on February 1.

That the explosion of a tank of naphtha in the Hardware store of Durham Brothers, Maxwell, Cal., on

the 26th ult., entailed considerable damage to the stock.

That M. L. Stringer has disposed of his Hardware business at Otisville, Mich., to Pettit & Craig.

That Col. J. F. Drish has sold his Hardware store at Mattoon, Ill., to Mr. Swickerd of Greenup, securing some farm property in exchange. Colonel Drish has been identified with the Hardware business of Mattoon since the close of the Civil War.

That Klavido & Stepanek is the style of a new Hardware firm organized at Traer, Iowa.

That the Hardware firm of Rood & Greenwood, Erwin, S. D. have dissolved partnership, Mr. Greenwood having disposed of his interest to A. W. Stone.

That Steinman & Smith have sold their Hardware store at Jenera, Ohio, to L. D. Reddick of Arlington, Ohio.

That the Hardware firm of Giddings & Patterson, Danville, Ill., have been dissolved, James A. Patterson retiring. The business will be continued by J. W. Giddings and his son, Frank A. Giddings, under the firm name of J. W. Giddings & Son.

That H. W. Crane & Co., Mt. Pleasant, Iowa, have sold out their stock of Hardware.

That the Falley-Patton Hardware Company, Lafayette, Ind., have been incorporated with a capital of \$10,000. Susanna B. Falley, James B. Falley and Jacob Patton are named as directors for the first year.

That Auguste Couillard, Hardware merchant of Montreal, Que., has sold out his stock to Dumont Laviolette. The business will be continued under the old style by D. Laviolette and O. W. Lauriault.

That the John Grove Hardware stock at Algona, Iowa, has been bought by David and F. L. Boals.

That H. J. Forbes and B. B. Brackin will open a Hardware store at Kinsman, Ohio, in the early spring. V. M. Cole of Andover, Ohio, is also thinking of entering the Hardware business at Kinsman.

That D. H. Thompson was admitted to partnership in the Hardware business of J. L. Roblee, Fond du Lac, Wis., on February 1. The firm style will hereafter be Roblee & Thompson.

That the Anderson Hardware and Furniture Company, St. Mary's, Kan., have been incorporated, with a capital stock of \$5,000.

That Kaufman's Hardware store at McPherson, Kan., was burned out on the 25th ult.

That Sullivan & Key's Hardware store at Nevada, Mo., was robbed of \$15 worth of Cutlery on the 24th ult.

That Emil J. Holmes, in the Hardware business at Cannon Falls, Minn., has disposed of his stock to C. G. Rapp. Mr. Rapp has taken into partnership with him Oscar F. Post, and the firm style is Rapp & Post.

That burglars entered the Hardware store of C. F. Thomas, Dorchester, Neb., on the 28th ult., and stole seven Guns, ten Revolvers, a keg of Powder and a number of Razors and Pocket Knives, Cartridges, &c., amounting in value to about \$250.

That Messrs. Huber and Kalbach of Oskaloosa, Iowa, have formed a co-partnership with Carl Phelps of Grinnell, Iowa, and have bought the Hardware stock of Johnson Bros. of Grinnell.

That T. P. Bruce has sold his interest in the Hardware business of Bruce

& Freeman, Pomona, Cal., to E. H. Garrett of Red Bluff, Cal. The style of the new firm will be Freeman & Garrett.

That the Gates Hardware Company, Springfield, Mo., have been incorporated with a capital stock of \$10,000.

That Hugo Schoessling will soon open a Hardware store at Jefferson Park, Ill.

That a company has been formed with a paid-up capital of \$5,000 to conduct a general Hardware business at Doon, Iowa.

That J. H. Smith's Hardware store, at Harrisville, R. I., was robbed on the 18th ult.

That Q. M. Ford will erect a new Hardware store at Rochester, Vt., in the early spring.

That J. H. Butler and George Seybold, as partners, have entered the Hardware business at Darlington, Ind.

That Oliver Lewis and Charles E. Wells of Hume, N. Y., have purchased the E. B. Fuller Hardware stock at Wellsville.

That the Hardware store of Dunkle & Barr, Clayville, Pa., has been disposed of to Noble & Jamison.

That the Hardware store of D. L. Esterly's Sons, Pottsville, Pa., was burglarized on the night of the 24th ult.

That O. Weman's Hardware store at Smith Lake, Minn., was burned out on the 28th ult.

That the stock and fixtures of the Kent Iron and Hardware Company, Wilmington, Del., were sold at Sheriff's sale on the 29th ult. for \$20,000. The company will be reorganized and continue in business.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

White Lead.—The market remains between the upper and the nether millstones. That is to say, the Trust continue to grind on merrily. The outside interest hold their own remarkably well, however, and it is extremely difficult to afford an idea as to how matters really stand. The surface appearances are that the market is a weak one in all that the term implies, and that outside competition is still somewhat annoying to the combined corrodors. One of the most conspicuous outsiders, with whom there have been negotiations lately, have maintained their independence and the various smaller concerns are conducting their affairs in an open, businesslike way, leaving legitimate trade influences paramount to the manipulations of combine interests. Official price-lists are therefore greatly ignored when it comes to the matter of actual business in either dry White Lead or Lead in oil. Lower prices than those that prevailed a week ago are not recorded in any quarter, but it is quite as plain, if not clearer, that no change for the better has taken place. In fact, orders for dry White Lead have been taken at 4¢ @ 4¼¢ in barrels, while Lead in oil at 1¢ over those prices has been secured without the least difficulty. The story is going the rounds, however, that affairs are gradually shaping for more complete combination and higher level of rates for all brands of old process Lead.

Red Lead.—In somewhat more modified form, but not less effective, the competition in this line has continued keen. Not only American manufacturers but importers of foreign goods have tried conclusions in various instances where anything in the way of desirable orders was concerned and low prices were the rule. In fact, the official list of combined American manufacturers has been virtually ignored, and sales of well-known brands made at 4¼¢ for round lots and 4¾¢ @ 5¢ for moderate quantities, as against official quotations of 5½¢ upward. On foreign stock the inside quotation is about 6¢, or too high for business of any magnitude at present rate of duty.

Litharge.—Some very fair orders for the cheaper grades have been secured, chiefly at very low prices, but business has been neither broad nor general, and the market still shows poor form, with prices leaning more or less in buyers' favor under the influence of sharp home and foreign competition.

Orange Mineral.—Sellers of both German and French brands are offering quite freely and with sufficient pressure to keep the market in quite ragged form. American product does not appear in any prominence as a factor, but prices for this as well as for imported stock are still very low and irregular. German may be secured at 7¢ to arrive, and 10¢ stands as best price for French in wholesale quantities. Domestic range between 7¢ and 8¢, according to brand and quantity.

Zincs.—The stiffer tone latterly in the market for crude material, due chiefly to rumors of curtailment of production, has served to steady the market in some degree, but the more substantial support of liberal orders is still wanting, and as yet prices have undergone no change for the better. In fact, it is easy to buy any of the various grades at former prices. There is more or less irregularity in actual selling prices of foreign brands, but no official announcement of changes has been made during the past week, and the market remains in rather poor form.

Colors, &c.—Slight improvement has taken place in the sale of leading lines of dry Colors used by grinders, but the business passing is rather behind the average for the season, and prices, with few exceptions, continue in buyers' favor. Oil Colors are in nearly as unenviable position, since sales are still rather below the average and competition quite keen. In Ready Mixed Paints the volume of business is expanding somewhat, but does not appear to reach proportions that would turn the tone of the market in any marked degree. Chalk, Whiting and Putty are meeting with merely routine sale, and show little change in value.

Oils and Turpentine.

Linseed Oil.—City crushers have made a reduction in the price of Raw Oil manufactured from Calcutta Seed. They now offer at 58¢ where

Oil do not appear to be parted with at less than 50¢ by crushers, and among handlers of out of town brands anything below 48¢ is strictly the exception at the moment.

Cotton Seed Oils.—A combination of adverse conditions, chief among which were slow demand and free offering, have served to weaken prices all along the line and give the market a very soft appearance. Prime quality crude Oil went at 29¢ and at the close there were more sellers than buyers at those figures. Prime Summer Yellow dropped to 33½¢ @ 34¢ on actual sale. Summer White sold down to 37¢ and other Varieties went quite as cheaply. The downfall is not hard to explain. Liberal supply and very indifferent demand practically tells the whole story.

Lard Oil.—Under the influence of dull trade, extremely routine demand and lower cost of raw material, the market has weakened still further. City brands, strictly prime Winter, have been sold as low as 66¢; out of town brands went quite as cheaply and more or less reduction has been made on the lower grades. Low prices have failed to stimulate business in the slightest degree and the market at present is dull as well as weak.

Fish Oils.—On actual sale the extremely low price, 61½¢ has been made in New Bedford and it seems no difficult matter to buy at a slight advance over that rate. Of crude Whale Oil no important sales are recorded, but the indications are that less than 40¢ would be accepted for some lots. American crude Menhaden Oil has to contend with fairly free offering of Japan Oil. The general position is thus rather unfavorable and the pressed and bleached Oils, while not openly offered at lower prices, can doubtless be purchased at prices below those generally quoted.

Miscellaneous.—Common Olive Oil is now freely offered at 62¢ @ 63¢ on the spot, 60¢ ex-ship nearly due, and down to 57¢ @ 58¢ for future shipment. None but very commonplace sales are making and the market shows rather weak tone. Coconut Oil for both prompt and future delivery is rather cheaper and selling in moderate quantities only.

Spirits Turpentine.—Higher prices at the leading sources of supply, along with moderate receipts here and very fair trade demand, have sufficed to carry prices higher. Sales were made at 33½¢ for ordinary barrels and 34¢ for machine barrels.

Samson Spot Cord.

Samson Cordage Works, 115 Congress street, Boston, Mass., in order to further protect the general public and themselves against the substitution of low grade cord, have adopted a distinctive trade-mark, which is to be at all times indicative of first quality goods. The works now make and carry



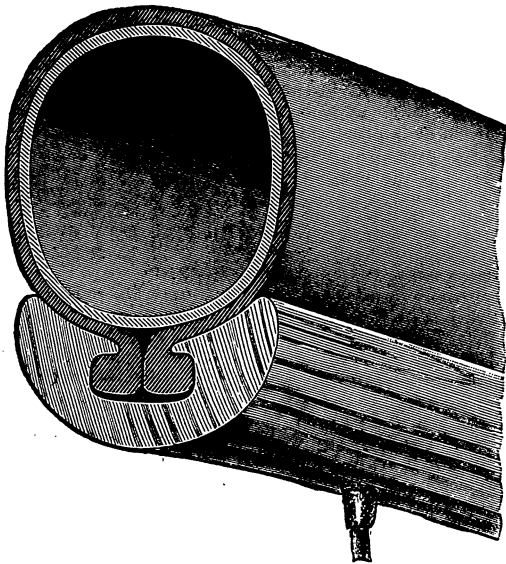
Samson Spot Cord.

62¢ was formerly quoted. It is claimed that some exceptionally fine Oil made from domestic Seed has been sold at as low as 55¢ @ 56¢, and that this is largely accountable for the reduction in quotations referred to. Ordinary Oil manufactured from American Seed has undergone no radical change in price and the market is bare of distinctly new feature. City brands Raw

in stock the Samson spot cord, as illustrated herewith, which is their regular Samson cord marked with a succession of spots of a different color from that of the body of the cord. The company state that this will be sold at the same price as the plain Samson cord, and that purchasers may have confidence that the spot is a guarantee of quality.

The Gee-Whiz Tire.

New York Belting & Packing Company, 15 Park row, New York, are introducing the bicycle tire represented

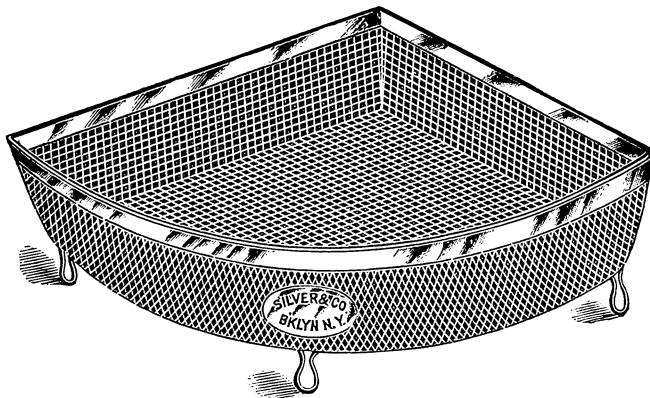


The Gee-Whiz Tire.

in the accompanying illustration. The tire is fitted on a special wood rim, mechanically attached. It consists of the rim, inner tube and cover; the heads of the cover being placed in the grooves of the rim, and the tire inflated. The manufacturers claim that the tire is very light in weight, practical and not complicated; also that in case of accident it can be ridden deflated.

Sanitary Sink Basket.

Silver & Co., 304-310 Hewes street, Brooklyn, with New York office 20 Warren street, are introducing a sink basket, as illustrated herewith. This is made of tinned wire, measuring 8½ inches along the straight edges and 10 inches from the center of the curve to the corner at the back. It is designed to be placed in the corner of the sink, into which all water is thrown, so that the basket may retain all the solid matter from the dirty water. The water thus passes through, leaving behind ref-



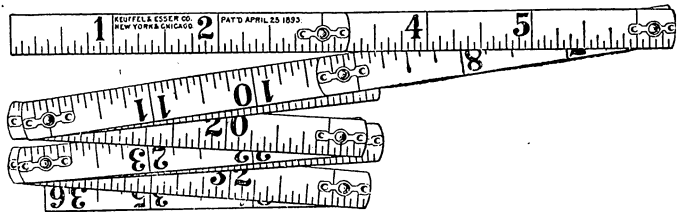
Sanitary Sink Basket.

use matter, such as tea leaves, coffee grounds, &c., preventing flooding and insuring a clean waste pipe. The solid matter may afterward be burned or otherwise disposed of.

Improved Sectional Steel Rule.

Keuffel & Esser Co., 127 Fulton street, New York, are offering an improved type of folding steel rule for pocket

use, as here shown. One of the features of this construction is the method employed for keeping the rule rigid



Folding Steel Rule.

when either extended or closed. This is accomplished by punching a circular indentation or button nearly $\frac{3}{8}$ inch in diameter on both sides of the rivet, at the end of each section. When opened or closed these bosses or knobs engage the corresponding de-

This also allows a workman to bend the rule anywhere at right angles if it is desired to measure objects horizontally above the head, without the rule becoming limp or collapsing at the pivots. The rivets joining the parts have been ingeniously alternated so that the thickness has been reduced about one-half, making the 2-foot size less than $\frac{1}{2}$ inch thick. Attention is called to the sharpness of the etched lines in the divisions, which indicate sixteenths of an inch that can be read instantly from either end, being graduated on both sides, with readings reversed. The rules are made in 1, 2 and 3 foot lengths.

Flour Bin and Sifter.

The illustration herewith given represents a flour bin and sifter, offered by Silver & Co., 304-310 Hewes street, Brooklyn, and 20 Warren street, New York. The bin combines a receptacle, aerator and sifter, made of heavy tin, without seams, japanned and painted on the outside. The handled cup underneath the sifter is graduated, holding 3 quarts, and six turns of the crank gives a quart of sifted flour. The manufacturers claim that the bin keeps the flour or meal sweet and clean any length of time, that it is a safeguard against mice and insects; that the revolving flanges inside the bin thoroughly aerate the flour, keeping it fresh and free from mold or mustiness, and that its use avoids labor, waste and

untidiness of reaching into barrels or sacks. The bins are made in three-



Flour Bin and Sifter.

sizes, to hold 25, 50 and 100 pounds, and are designed to be placed on a table or shelf.

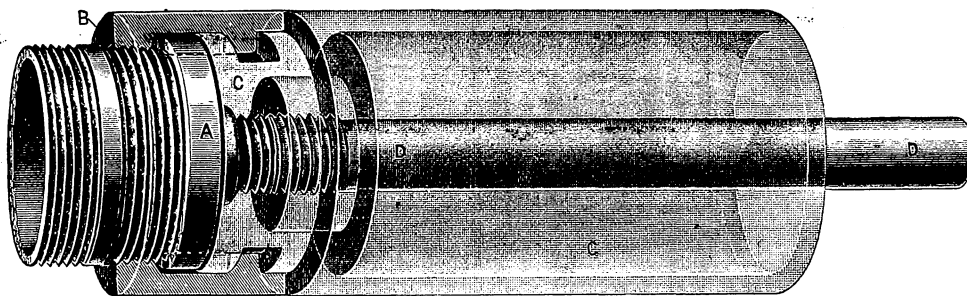
New Nipple Holder.

Curtis & Curtis, Bridgeport, Conn., have just placed on the market a new nipple holder, shown in the accompanying illustrations. The special object sought in this device is to make a holder that would be cheap, of small diameter so that it could be used in a pipe machine and at the same time be capable of taking a large range of sizes and not require the use of a hammer or other tool. Fig. 1 is a transparent view showing the working of the holder, while Fig. 2 shows one of the sockets which is a part of the holder, these sockets being made in different sizes to

for the use of pattern makers. It is not offered as a new implement, but as one better made and more accurately graduated than many heretofore made. The purpose of this kind of rule is to enable the workman to so construct a wooden pattern that when the metal pattern is cast from it, when cooled and shrunk will be just the size he originally intended it should be. Having in mind the regular scale of shrinkages of the various metals, the pattern maker, for example, uses a rule ostensibly 2 feet long, but actually $24\frac{1}{2}$ inches in length. This is subdivided in eighths, tenths, twelfths and sixteenths, so proportioned that the pattern made to this standard will produce a certain

National Coffee, Drug and Spice Mill.

The cut herewith shows a coffee, drug and spice mill, which is being placed on the market by the National Specialty Mfg. Company, Philadelphia. The mill is constructed of iron, the hopper and body being octagonal in shape, with round base. The novel feature in the mill is in the grinding adjustment. Coarse or fine grinding may be done by screwing or unscrewing the corrugated nut seen on the shaft. The nut is fitted with a brass washer keyed to the shaft in such a way as to form a dead stop and thus cause



New Nipple Holder.—Fig. 1.—Transparent View of Holder.

fit the various sizes of nipples. To operate the holder the socket B, Fig. 1, of the proper size of pipe to be cut is screwed to the body C by a one-eighth turn and the screw D is run forward by a wheel provided for the purpose. The nipple is then secured as shown in the cut, but is so arranged that it bottoms on the plunger A before it jams in the thread and is thus held securely. To release the nipple, a part revolution of the screw D will allow it to be removed

metal pattern which, after shrinking, will be the required size. The rules are made in the following lengths—viz, $24\frac{2}{10}$, $24\frac{1}{2}$, $24\frac{3}{4}$, 25 , $25\frac{1}{2}$, 26 , $26\frac{1}{2}$ to 2 feet, and graduated in eighths, tenths, twelfths and sixteenths by machinery. These rules are likewise valuable where double shrinkage must be considered.

The Bridgeport Cyclometer.

The Bridgeport Gun Implement Company, 313-315 Broadway, New York, are offering a cyclometer, as herewith shown. Frictional studs are provided to overcome all possibility of rattling or weakening springs, the works are protected from dust and moisture by cemented glass covers and the register posts are protected by felt washers. The manufacturers state that the cyclometer gives a positive register; that it is constructed upon simple mechanical principles which guarantee ac-

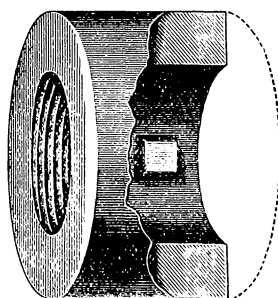


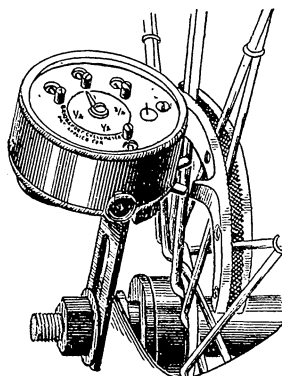
Fig. 2.—Broken View of Socket.

by the fingers. These holders can either be used in a vise with a common die stock or with any of the pipe machines now on the market. The firm also mention that they can be used with their Forbes patent die stock. To meet the requirements of the common style of overhung spindle machines, Curtis & Curtis have adapted this same principle to a holder intended for their use. Either right or left threads can be made with equal ease, and at a very slight expense sockets for any unusual size thread required can be provided. They are now made in various sizes up to a capacity for 6-inch pipe, but they can be made to any required size.

Shrinkage Rules.

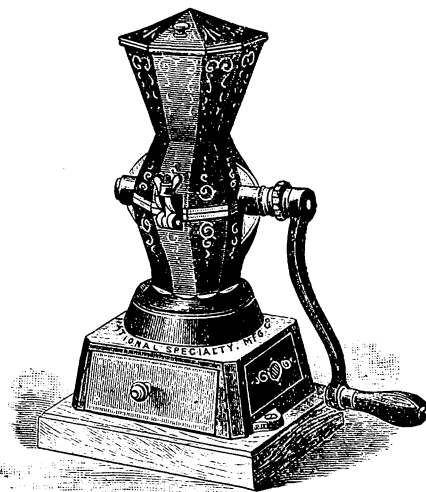
Keuffel & Esser, 127 Fulton street, New York, and 265 State street, Chicago, are manufacturing a boxwood shrinkage rule or scale with brass ends,

curacy in themselves; that it registers accurately up to 1000 miles and repeats or can be set back at will, and that it is adjustable to any bicycle and can be read from the saddle. Two sizes of the cyclometer are made, for 28-inch and 30-inch wheels, weighing $6\frac{1}{2}$ ounces.



The Bridgeport Cyclometer.

the nut to revolve with the shaft. Loosening of the nut is, it is claimed, in this way entirely obviated. The mill is handsomely finished and ornamented



National Coffee, Drug and Spice Mill.

and is pleasing in appearance. It is made in two sizes, Nos. 1 and 2, the latter having wheels instead of crank.

Shipley's Cutlery Enamel.

A. B. Shipley & Son of 503 Commerce street, Philadelphia, are calling the attention of hardware dealers to their cutlery enamel. The enamel supplies the need of a preparation which can readily be applied to cutlery or bright ware, for marking purposes, with an ordinary pen. A price or number can be marked on cutlery or plated ware without blot or blur, and the marking will dry in about two minutes. When desired it may be removed with a rag and powdered chalk or putz, without leaving a stain or scratch.

The makers guarantee that it will not rust or corrode the finest crocus finish, as there is nothing in its composition to induce rust or corrosion. Hardwaremen not already using the enamel will do well to try it, if only to obviate the use of the unsightly scratched mark so often objected to by customers. Salesmen, too, where the enamel is used, will have no occasion to use a new knife from stock whenever a few goods have to be marked, a practice common in many establishments.

Stanley's Improved Scrub Plane

The accompanying cuts represent a plane and plane iron being introduced by Stanley Rule & Level Company,

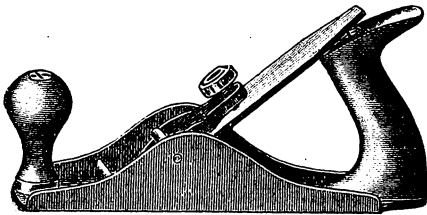


Fig. 1.—Stanley's Improved Scrub Plane.

New Britain, Conn., and 29 Chambers street, New York. The plane has a single iron, as shown in Fig. 2, which has its cutting edge slightly rounded. With the plane, it is explained, coarse work can be quickly roughed down be-

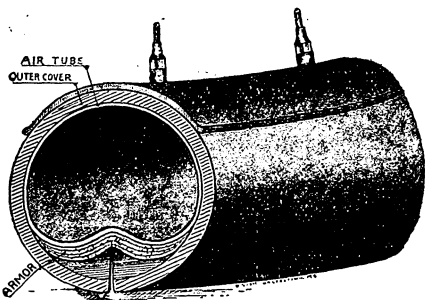


Fig. 2.—Scrub Plane Iron.

fore using a jack plane on it. The manufacturers remark that the plane is well adapted to take the place of a German tool designed for the same use, but made of wood.

Punctureless Armor for Pneumatic Tires.

The accompanying illustration shows a section of a pneumatic tire provided with the punctureless armor placed on



Punctureless Armor for Pneumatic Tires

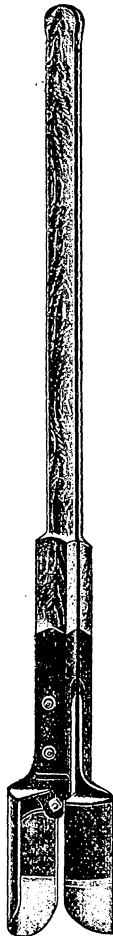
the market by the Punctureless Tire Armor Company of Hagerstown, Md.

The armor is described as being composed of tough, fibrous materials, chemically treated, to render it impenetrable to any sharp pointed or cutting obstruction and yet remaining as light and flexible as cloth. It is explained that the armor can be applied in a few minutes to any form of pneumatic tire having an air tube, and that in legitimate riding on roads or streets the air

tube is thereby protected from puncture, even though the outer casing should be punctured all over. The resiliency of the tire, it is claimed, is in no way affected. The armor is made in lengths to fit 26, 28 and 30 inch wheels, and 2, 1½ and 1¼ inch tires, and is supplied in various thicknesses, suitable for touring, road or track work.

The Pioneer Post Hole Digger.

F. E. Kohler & Co., Canton, Ohio, are putting the post hole digger here



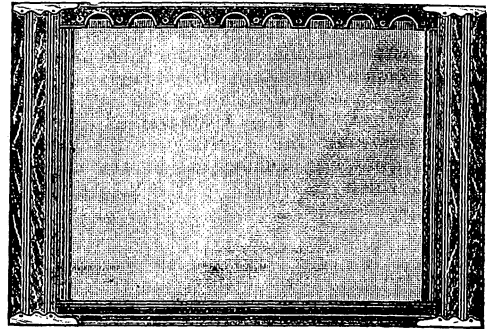
The Pioneer Post Hole Digger.

shown on the market. It is made with folding handles, steel blades properly tempered, and strong malleable iron shanks. The manufacturers remark that the folding handles are an improvement over split handles not folding, being stronger and more easily opened, the strain thus coming against the thick way of the handles.

Empire "A" Window Screens.

White, Van Glahn & Co., 15-17 Chatham square, New York, agents for Brockville Wringer Company, Morristown, N. Y., are putting on the market the Empire "A" window screen, as here shown. This screen is constructed with a view to not only keeping flies, mosquitoes and similar pests out of a building, but whenever they get in from one cause or another, allowing them to go out. The screen is constructed on the principle that flies, when they alight on a perpendicular surface, walk up, not down. The semi-circular openings at the top of the screen are for the purpose of allowing the insects to get out. The screens are

alluded to as being constructed of hard wood, well and strongly made and finished in oil. The extensions are operated by steel springs, so that they can be placed either under or just outside of sash. Placed on outside of sash, the



Empire Window Screen.

pressure of the springs maintains the screen in place, so the window can be raised or lowered at will. The corners are reinforced with iron caps and covered with a bronze paint. Screen doors are also made by this company on the same principle, with openings at the middle and top cross pieces. The window screens are made regularly in eight sizes and the doors in four sizes.

The Handy Holder.

The accompanying illustrations, Figs. 1 and 2, show a handy holder which H. C. Weidenmann, 3517 Wallace street, Philadelphia, is putting on the market.



Fig. 1.—For Horizontal Bars.

The holder is made of sheet steel, and nickel plated. The shape of the clamp allows of adjustment to bars of any shape, round, square or oval. A tongue on one side of the clamp engages, upon pressure, with lips on the other side, thus when in service locking the holder securely to the bar. A strip of rubber on the inside of the clamp prevents scratching or rattling. The holder was designed chiefly for the purpose of holding or carrying decorations, coats, umbrellas or packages of any kind on



Fig. 2.—For Vertical Bars.

bicycles, although it is adapted equally as well for use on wagons or carriages as a rein or rug holder. It may also be used for a store window clip and for a variety of other purposes.

Several labor organizations of Pittsburgh have arranged to send representatives to Washington to attempt to get tariff hearings before the Senate.

FEBRUARY 14, 1894.

The character @ is used to indicate a range 'of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Blue, case lots... gr 75¢; small lots, 80¢
Red, case lots... gr 87¢; small lots, 77¢
White, case lots... gr 50¢; small lots, 55¢

Chalk Lines—See Lines.

Checks, Door—

Unity 50%

Chisels—

Socket Framing and Firmer

Mix 75¢10¢75¢10¢10%

New Haven 75¢10¢75¢10¢10%

Ohio Tool Co. 75¢10¢75¢10¢10%

P. S. & W. 75¢10¢75¢10¢10%

Wetherby

Buck Bros. 30%

Douglass 75¢75¢85%

Merrill 60¢10¢60¢10¢85%

L. & J. White 50¢30¢85%

Tanged and Miscellaneous.

Buck Bros. 30%

Butchers' \$4.75¢\$5.00 to 2

Spears & Jacksons' \$5 to 2

Tanged Firmers 50¢50¢10%

Cold Chisels, fair quality, 1 lb 14¢10%

Chucks—

Beach Pat. each, \$3.00, 20%

Danbury each, \$3.00, 30¢30¢5%

Graham Patent 33%

Morse's Adjustable, each, \$7.00, 20¢20¢5%

Syracuse, Bala Pat 25%

Skinner's Patent Chucks 33%

Combination Lathe Chucks 33%

Drill Chucks 15%

Independent Lathe Chucks 40%

Universal Lathe Chucks 40%

Union Mfg. Co. 40%

Combination 40%

Independent 40%

Universal 40%

Victor \$3.50, 25%

Churns—

McDonald Star Barrel Churn, each - 6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.

Tiffin Union, each, 5 gal. \$3.25; 7 gal., \$3.75; 10 gal., \$4.25.

Clamps—

Adjustable, Cincinnati 15¢10%

Adjustable, Hammers 15¢15¢5%

Adjustable, Stearns' 30¢30¢10%

Barnes' Machinists' Clamps 33%

Cabinet, Sargent's 70¢10%

Carpenter's, Cincinnati 25%

Carriage Makers', P. S. & W. Co. 40¢10%

Carriage Makers', Sargent's 75¢75¢5%

Eberhard Mfg. Co. 40¢5¢40¢10%

R. I. Tool Co.'s Wrought Iron 25%

Saw Clamps, see Vices, Saw Filers'

Stearns' Adjustable Cabinet and Cor 30¢30¢10%

Warner's 40¢10¢40¢10¢5%

Cleavers, Butchers'—

Beatty's 40¢40¢5%

Bradley's 25¢30%

Foster Bros. 30%

New Haven Edge Tool Co.'s 40%

Nichols Bros. 40%

P. S. & W. 33%45¢33%45%

Schulte, Lohoff & Co. 40¢40¢5%

L. & J. White 20¢25%

Clips—

Baker Axle Clips 25%

Norway, Axle, 4 & 5-16 55¢55¢5%

Norway Spring Bar Clips, 5-16 60¢55¢5%

24 gr. Norway Axle, 4 & 5-16 55%

Steel Felloe Clips 5¢

Superior Axle Clips 65¢45¢70%

Wrought Iron Felloe Clips 5¢, 5¢

Cloth and Netting, Wire—

—See Wire, etc.

Cockeyes 50%

Cocks Brass—

Hardware list (Globe, Kerosene, Lever, Bibbs, Racking, etc.) 60¢20¢60¢10%

Coffee Mills—See Mills, Coffee.

Coffee Dig—

Brass, Pope & Steven's list 40%

Chapman Mfg. Company, new list 40%

Embossed, Gilt, Pope & Steven's list 30¢10%

Leather, Pope & Steven's list 40%

Medford Fancy Goods Co. 40¢10¢50%

Combs—

American Curry Comb Co. 33%45%

Fitch's 50¢10¢50¢10¢10%

Gibbs' Magnetic 5¢ doz., \$2.00

Kohler's Humane 5¢ doz., \$1.75

Kohler's Magic Oscillating 5¢ doz., \$2.00

Rubber, per doz., \$10.00, 25%

Compasses, Dividers &c.

Compasses, Calipers, Dividers, 70¢10¢75%

Bemis & Co.'s

Dividers 65%

Calipers, Call's Patent Inside 55%

Calipers, Double 55%

Calipers, Inside or Outside 55%

Calipers, Wing 60%

Compasses 50¢55%

Excelsior 50%

Starrett's 50%

Combination Dividers 25%

Lock Calipers and Dividers 25%

Spring Calipers and Dividers 25¢10%

Stevens & Co.'s 25¢10%

Coolers, Water—

S. B. & Co., 2-gal., \$2.00; 3-gal., \$2.50; 4-gal., \$2.75; 5-gal., \$3.40 each. 33%

Coopers' Tools—

—See Tools, Coopers'.

Cord Sash—

Braided, Crown Drab and Fancy, 30¢

55¢

Braided, Crown White, 50¢

Cable Laid Italian Sash 19¢20%

Common 8¢45%

Common Russia Sash 12¢, 12%13%

Egyptian, India Hemp, Braided 13%

India Cable Laid Sash 11¢, 11%12%

Massachusetts, White 25%

Ossawa Mills—

Braided, Giant, Drab and Fancy, 8¢

Braided, Giant, White, 30¢

Patent, good quality 10¢11%

Patent Russia Sash 13%14%

Samson—

Braided, Drab Cotton 42%

Braided, Italian Hemp 40%

Braided, Laid 55%

Braided, White Cotton 57%

Semper Idem, Braided, White 26%

Silver Lake—

A quality, Drab, 55¢ 25%

A quality, White, 60¢ 25%

B quality, Drab, 35¢ 10%

B quality, White, 30¢ 10%

Sylvan Spring, Extra Braided, Drab 39%

Sylvan Spring, Extra Braided, White 34%

Tate's Solid Braided—

Economy, Drab 27%

Economy, White 22%

Hercules, Drab 30%

Hercules, White 25%

White Cotton Braided, fair 23¢24%

Wire Picture—

Braided or Twisted 80¢25¢80¢15%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—

—See Knives, Corn.

Crackers, Nut—

Acme

Japanned, 7 gro., \$30 50%

Nickel Plated, 7 gro., \$30 10%

Blake's Pattern, 7 doz., \$2.00 10%

Table (H. & B. Mfg. Co.) 40%

Turner & Seymour Mfg. Co. 50%

Cradles—

Grain 50¢2¢50¢5¢2%

Crayons—

White Crayons, 7 gross 70¢8¢

D. M. Steward Mfg. Co.

Metal Workers', 7 gross, \$2.50 25%

Railroad, 7 gross, 2.00 25%

Rolling Mill, 7 gross, 2.50 25%

Soapstone Pencils, 7 gross, 1.50 25%

See also Chalk.

Creamery Pails—See Pails, Creamery.

Crow Bars—See Bars, Crow.

Curry Combs—

—See Combs, Curry.

Curtain Pins—

—See Pins, Curtain.

Cutters—

Meat—

American 30%

Nos. 1 2 3 4 5 6

Each \$5 \$7 \$10 \$25 \$50 \$60

Enterprise 10 22 32 42

Each \$3 \$2.50 \$4 \$8 \$15

Dixon's, 7 doz. 40¢40¢5%

Nos. 1 2 3 4

Each \$14.00 \$17.00 \$19.00 \$30.00

Draw Cut, each

Nos. 5 6 7 8

Each \$50 \$75 \$80 \$225 20¢25%

Hale's, 7 doz. \$20 70%

Nos. 11 12 13

Each \$27.00 \$33.00 \$45.00

Home No. 1, 7 doz., \$26.00 55¢10%

Little Giant, 7 doz., 40¢10¢50%

Nos. 310 312 320 322

Each \$35.00 \$48.00 \$44.00 \$72.00 \$88.00

Miles' Challenge, 7 doz. 45¢45¢10%

Nos. 1 2 3 4

Each \$22.00 \$30.00 \$40.00

Triumph No. 505, 7 doz., \$21.00, 25¢30%

Woodruff's, 7 doz. 40¢40¢5%

Nos. 100 150

Each \$15.00 \$18.00

Chadborn's Smoked Beef Cutter, 7 doz., \$60.00

Enterprise Beef Shavers 20%

Slaw and Kraut—

Tucker & Dorsey Mfg. Co. 40%

Kraut Cutters

Slaw Cutters, 1 Knife, 7 gross, \$21.00

Slaw Cutters, 2 Knife, 7 gross, 30.00

Tobacco—

Acme 40%

All Iron 40%

Champion 20¢10¢30%

Nashua Lock Co.'s, 7 doz., \$18.00, 50¢55%

Sargent's 7 doz., \$24.00, 55¢10%

Wilson's 55%

Washer—

Appleton's 7 doz., \$16.00, 60¢10%

Bonney's 30¢10%

Cincinnati 25¢10%

Johnson's 7 doz., \$11.00, 33%4%

Penny's, 7 doz., Pol. \$14; Jap'd, 16¢, 55%

Smith's Pat., 7 doz., \$12.00, 20¢10¢10%

Diggers, Post Hole, &c.—

Cronk's Post Bars, 7 doz., \$60.00

Eureka Diggers 50¢10¢50¢10%

Fletcher Post Hole Augers, 7 doz., \$36.00

20¢20¢10%

Gem, Improved 7 doz., \$9.00, \$10.00, net

Gibbs' Columbia 7 doz. \$12.00

Gibbs' Hustler 7 doz., \$10.00

Gibbs' Imperial 7 doz., \$7.50

Gibbs' National 7 doz., \$12.00

Gibbs' Post Hole Digger 7 doz., \$12.75

Kohler's Hercules 7 doz., \$14.00

Kohler's Inviolable 7 doz., \$12.00

Kohler's Little Giant 7 doz., \$18.00

Kohler's New Champion 7 doz., \$8.00

Samson 7 doz., \$34.00 50¢55¢10%

Scheldler 7 doz., \$18.00

Shimer's Hollow Handle 7 doz., \$24.00, 50%

Vaughan's Post Hole Auger, 7 doz., \$8.50, \$9.50

Dividers—See Compasses.

Dog Collars—See Collars, Dog.

Door Checks—

—See Checks, Door.

Door Springs—

—See Springs, Door.

Drawers—

Money 7 doz., \$18¢\$20

Waddell's Improved, No. 1 7 doz. \$15.00

Waddell's Improved No. 2 7 doz. \$18.00

Waddell's Desk and Drawer, each \$7.50

Waddell's Desk and Show case, each \$7.50

Drawing Knives—

—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths' 50¢10¢10%

Blacksmiths' Self-Feeding, each \$7.50, 20%

Automatic Boring Tools 17¢50¢18¢50

Breast, Bartholomew's 25¢10¢40%

Breast, Millers Falls 50¢10¢25%

Breast, P. S. & W. 40¢10%

Breast, Wilson's 30¢5%

Chippendale Automatic Drill 20¢10%

Goodell Automatic Drills 40¢5%

Ratchet, Curtis & Curtis 30%

Ratchet, Ingersoll's 25%

Ratchet, Merrill's 20¢20¢5%

Ratchet, Moore's Triple Action 25¢30%

Ratchet, Parker's 20¢5%

Ratchet, Weston's 20¢10%

Ratchet, Whitney's 20¢10%

Whitneys Hand Drill, Plain, \$11.00, 20%

Adjustable \$12.00, 20¢10%

Twist Drills—

Cleveland 50¢10¢10%

Diamond, W. & B. 50¢10¢10%

Graham's Pat. Groove Shank 50¢10%

Morse 50¢10¢10%

New Process 50¢10¢10%

Standard 50¢10¢10%

Syracuse (Metal list) 50¢10%

Drill Bits or Bit Stock

Drills—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—

—See Pans, Dripping.

Drivers, Screw—

Allard's Spiral, new list 25%

Brace Screw Drivers 25¢10%

Buck Bros. 30%

Buck Bros' Screw Driver Bits 27¢25%

Clark's Pat. 30¢33%

Cincinnati 25¢10%

Champion 25¢10%

Disston's 50%

Douglass Mfg. Co. 20¢20¢10%

Ellrich's Socket and Ratchet 25¢25¢10%

Fray's Hol. H. die Sets No. 3, \$12.00, 45%

Gay & Parsons 50%

Goodell's Automatic 55%

Knapp & Cowles 25%

No. 1 60¢20¢70%

No. 2 60¢10¢10¢70¢5%

No. 3 60¢20¢80¢10%

Nos. 4 and 60, Acme and Ideal 50¢5%

Kolb's Common Sense, 7 doz., \$3.00, 25¢10%

Mayhew's Black Handle 50%

Mayhew's Monarch 45¢10%

P. S. & W. 70%

Sargent & Co.'s Blade 60¢10¢10%

No. 1, Forged and 60 60¢40¢10%

Screw Driver Bits, Parr's, 7 gross, \$6.25

Screw Driver Bits 50¢75¢

Stanley & L. Co.'s

No. 64, Varnished Handles 55¢10%

No. 70 70¢10%

Stearns' 25¢10%

Syracuse Screw Driver Bits 30¢30¢5%

C. T. Williamson Wire Novelty Co. 50%

Egg Beaters—See Beaters, Egg.

Egg Poachers—

—See Poachers, Egg.

Electric Bell Sets—

—See Bells, Electric.

Emery—No. 1 to No. 54 to Flour, CF

46 gr. 150 gr. F.F.F.

Kegs, 1 lb. 45¢ 5¢ 8¢

14 Kegs, 1 lb. 45¢ 5¢ 8¢

10 lb. cans, 10 5¢ 5¢ 5¢

10 lb. cans, less 10¢ 10¢ 8¢

Enameled and Tinned Ware—See Ware, Hollow.

Escutcheon Pins—

—See Pins, Escutcheon.

Escutcheons—

Brass Thread 60¢60¢10%

Door Lock Same dia. as Door Locks 25%

Wood 25%

Expanded Metal—

List No. 5

Door Mats, Galvanized 25%

Fencing, Painted Sheets 20%

Lathing 10%

Netting, Painted Sheets 20%

Tree Guards, Paneled 15%

Window Guards, Paneled 15%

Extractors, Lemon Juice—

—See Squeezers, Lemon.

Fasteners, Blind—

Austin & Eddy No. 2008 7 gr., \$9.00

Mackrell's, 7 doz., \$1.00, 20¢20¢10%

Security Gravity 7 gr., \$9.00

Van Sand's Old Pat. \$15 7 gr., 55¢10%

Van Sand's Screw Pat. \$15 7 gr., 60¢10%

Zimmerman's 60¢10%

Faucets—

B. & L. B. Co.

West's Lock, Open and Shut Key 50%

Burnside's Red Cedar 50%

Burnside's Red Cedar, bbl. lots 50¢10%

Cerk Lined 70¢5¢70¢10%

Fenn's 40%

Fenn's Cork Stops 33%

Frary's Pat. Petroleum 60%

Metallic Key, Leather Lined 60¢10%

60¢10¢10%

John Sommers'

Peerless Best Block Tin Key 40%

IXL, 1st quality, Cork Lined 50%

Diamond Lock 40%

Perfection, Fla. Red Cedar (in boxes) 40%

Boss Metallic Key 60%

Reliable Cork Lined 60%

O. K. Western Pattern Cork Lined 50%

No Brand, Red Cedar (in bbls.) 50¢10%

Western Pattern Metal Key 40%

No Brand Metal Key 60%

Self Measure

Enterprise, 7 doz., \$36.00, 20%

Lane's 7 doz., \$36.00, 25¢10%

Star 60%

Star, Metal Plug, new list 40%

Lockport, Metal Plug, reduced list 60%

Felloe Plates—

—See Plates, Felloe.

Fibre Ware—See Ware, Fibre.

Fifth Wheels—

Brewster 50¢5%

Derby and Cincinnati 45¢5%

Files—

Domestic—

American 50¢40¢10¢60¢10¢5%

ArCADE 50¢40¢10¢60¢10¢10%

G. & B. Barnett (Black Diamond) 60¢10¢5%

60¢10¢5%

Eagle 60¢10¢10%

Nicolson Files, Rasps, &c. 60¢10¢10%

60¢10¢10%

Nicholson (X.F.) Files 25%

Nicholson's Royal File (Seconds) 75%

Extra prices on certain sizes

Other makers, best brand 60¢10¢5%

Fair brands 70¢10¢70¢10%

Second quality 80¢80¢5%

ArCADE Horse Rasps 50¢10¢10¢5%

Chelsea Horse Rasps, Hand Cut 50¢10%

Helical Horse Rasps 50¢10¢5%

McCaffrey's Horse Rasps 50¢10%

Trojan Horse Rasps 60¢10¢5%

Imported—

Butcher 7 doz., \$15, 20%

Stubbs' 7 doz., \$15, 20%

Fixtures Grindstone—

Moore's 55%

P. S. & W. Co. 50¢10%

Reading Hardware Co. 30¢10%

Sargent's Patent 70¢10%

Fluting Machines—

—See Machines, Fluting.

Fluting Scissors—

—See Scissors, Fluting.

Fodder Squeezers—

—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso. List, 70¢70¢55%

Hay, Manure, &c., Phila. List, 80¢60¢10%

Plated, see Spoons.

Frames—

Saw—

Red, Polished and Varnished 50%

White Vermont 7 gr., \$9.00, \$10.00

Screen, Window and Door—

Screen, Window Screens 50¢50¢10%

Cortland 40¢40%

Empire Fancy Screen Doors, 7 doz. \$13

Phillips' Window Screen Frames 50¢50%

Peater's Pat. Window and Door Frame 33%45%

Stearns' Frames and Corners 25¢25¢10%

Wabash Adjustable Window Screen 40¢5%

Warner's Screen Corner Irons 33%45%

Freezers, Ice Cream—

American 60%

Arctic 70¢70%

Blizzard 70%

Boss and Pet. 60¢10¢10%

Buffalo Champion 65¢55%

Construction Machine 50%

Double Action Crown 60%

Gem 55%

Giant 60%

Good Luck 65¢55%

Gratts' Standard 55%

Kentstone, P. D. & Co., each \$1.50 20%

Model 60¢60%

Ohio 60¢10%

Peeries 60¢10%

Shepard's Lightning 65¢55%

Standard 60¢60%

Standard Double Action 60¢60%

Star 60%

White Mountain 60¢60%

Zero 70%

Fruit and Jelly Presses—

—See Presses, Fruit and Jelly.

Fruit Pickers—

—See Pickers, Fruit.

Fry Pans—See Pans, Fry.

Funnels—

Gersdorff's Perfection, Standard and Globe, Tyn, 1 gro., 10¢; 2 to 5 gro., 20¢; 6 to 10 gro., 30%

Copper, 1 to 6 doz., 15¢; 6 to 12 doz., 20¢; over 12 doz. 25%

Furnaces, Soldering—

Burgess No. 3 Gem, Copper reservoir, \$8.50

Burgess No. 3 Gem, tin reservoir, \$7.00

Clayton & Lambert No. 1 Fire Pot, complete 50%

Fuse—Dis. 10¢2¢ cash. 7¢10¢100¢

Common Cotton Fuse, for dry grnd. \$3.00

Common Hemp Fuse, for dryground, 2.80

Double Taped Fuse, for very wet gr., 5.60

Single Taped Fuse, for wet ground, 4.75

Triple Taped Fuse, for very wet gr., 6.40

Large Gutta Percha Fuse, for water 15.00

Small Gutta Percha Fuse, for water 10.00

Gates Molasses—

Boss, 7 doz.

No. 1 80%

No. 2, 88; No. 3, 89; No. 4, 90%

Lincoln's Pattern 70¢70¢10%

Stebbin's Genuine 60¢10¢10%

Stebbin's Pattern 80¢10¢80¢10%

Stebbin's Tinned Ends 40¢10%

Weed's 20¢10%

Gauges—

Bartlett's Comb. Roller Gauge 7 doz., \$8.00, \$8.50

Hoague & Peck's Champion Gauge With Scale 50%

Without Scale 50%

Marking, Mortise, &c. 60¢10%

Stanley K. & L. Co.'s Butt and Rabbit Gauge 25¢10%

Starrett's Surface, Center and Scratch 25%

Wire, Brown & Sharpe's 10¢20%

Wire, Morse's 25%

Wire, P. S. & W. Co. 10¢10%

Wire, Wheeler, Madden & Co. 10%

Gimlets—

Nail and Spine 50¢10¢5%

Diamond Gimlets 50%

Eureka Gimlets 40%

Double Cut, Douglass' 40¢10%

Double Cut, Ives' 60¢60%

Double Cut, Shepardson's 45¢45¢5%

Glue—

Dodd's Liquid Glue 25¢25¢5%

Improved Process 25¢25¢5%

Upton's Liquid 35%

Glue Pots—See Pots, Glue.

Grease, Axle—

Axiene, tin boxes 7 gr. gross \$12.00

Dixon's Everlasting, 10 lb pails, ea. \$5

Dixon's Everlasting, in bxs. 7 doz 12

\$1.20; 2 doz 3

English Coach, 5 lb tin pails 7 doz, \$3.50

English Coach, wooden boxes 55%

Fraser's 7 gr. \$5.50, \$7.00

Fraser's, in boxes 50%

Fraser's, in boxes 50%

Lower grades, special brands.

Tiger, 5 lb tin pails 7 gr \$5.50, \$7.00

Tiger, wooden boxes 7 gr \$5.50, \$7.00

Grindstones—

Family Grindstone 60%

Family, Cleveland Stone Co. 20%

Grindstone Fixtures—

—See Fixtures, Grindstone.

Gun Powder—See Powder.

Hack Saws—See Saws.

Hatts, Awl—

Sewing, Brass, Eng. 7 gr. \$1.75

Pat. Sewing, Eng. 7 doz \$1.20

Pat. Sewing, Shart. 7 doz \$1.20

Pat. Peg Laid, Top 7 doz \$1.20

Pat. Peg, Plain Top 7 doz 40¢45%

Halters—
 Covert's Ad. Rope Halters..... 40&24
 Covert's Ad. Wob Halters..... 35&52
 Covert's Hemp Horse and Cattle Tie..... 50&10&24
 Covert's Jute Cattle Ties..... 70&10&24
 Covert's Jute Horse Ties..... 70&24
 Covert's Rope, 7-16 in. Jute..... 70&24
 Covert's Rope, 1/2 in. Hemp..... 50&24
 Covert's Rope, Jute..... 60&10&10&24
 Covert's Saddlery Works Halters..... 33&24
 Covert's Saddlery Works Handy Web Halters..... 33&24
 Covert's Saddlery Works Horse and Cattle Ties..... 33&24

Hammers—
Handled Hammers—
 Atha Tool Co..... 50&10
 Buffalo Hammer Co..... 50&10
 Humason & Beckley..... 50&10
 Verree..... 50&10
 Cheney's Claw..... 40&10
 Cheney's Machinists' & Riveting..... 50&24
 C. Hammond & Son..... 40&10
 Magneto Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75..... 25&10&35
 Maydole's, Hat Dec. 1, 35..... 25&10&35
 Nelson Tool Works..... 40&10
 Peck, Stow & Wilcox..... 35&40
 Fayette R. Plumb..... 40&10
 Artisan's Choice, A. E. Nail..... 40&10
 Horseshoe Turning Hammers..... 50
 Regular Y. & F. A. E. Nail..... 50
 Other Hammer..... 50
 Sargent's..... 40&10
 Warner & Nobles, new list..... 25&10

Heavy Hammers and Sledges—
 3 lb and under..... 75&15
 3 to 5 lb..... 80
 Over 5 lb..... 80
 Wilkinson's Smiths..... 10&11

Handcuffs and Leg Irons—
 See Police Goods.

Handies—
Cross Cut Saw Handles—
 Atkins, new list..... 40
 Champion..... 15
 Ely's Perfection..... 35
 Sensible..... 40

Iron, Wrought or Cast—
 Barn Door, per doz..... 10&10
 Bronze Iron Drop Latches..... 70
 Chest and Lifting..... 70
 Door or Thumb..... 10
 Per doz..... 1.00 1.08 1.35 1.50
 Jap's Store Door Handles—Nuts, \$1.62; Plate, \$1.10; no plate, \$0.88; net Roggin's Latches..... 30&35

Wood—
 Auger, assorted..... 50
 Auger, large..... 70
 File, assorted..... 25
 Brad A.W.I..... 20
 Apple Firmer Chisel, ass'd..... 50
 Apple Firmer Chisel, large..... 60
 Hickory Firmer Chisel, ass'd..... 45
 Hickory Firmer Chisel, large..... 50
 Socket Firmer Chisel, ass'd..... 30
 Socket Firmer Chisel, large..... 35
 Hammer, Hatchet, Axe, &c..... 40
 Hoe, Rake, Shovel, &c..... 30
 Pat. Auger, Douglass..... 15
 Pat. Auger, Ives..... 30
 Pat. Auger, Swan's..... 15
 Saw and Plane..... 40
 J. B. Smith & Co's Pat. File..... 50

Hangers—
 Barn Door, New England..... 70
 Barn Door, old patterns..... 70
 Barry..... 50
 Best Anti-Friction..... 60
 Boss..... 60
 Carrier Steel Anti-Friction..... 50
 Champion..... 60
 Chicago Anti-Friction..... 30
 Climax Anti-Friction..... 55
 Cincinnati Nos. 1, 2, 25; 3, 26; 4, 27..... 50
 Crescent..... 60
 Cronk's Patent, Steel Covered..... 50
 Duplex (Wood Track)..... 60
 Economy, 36, 00..... 60
 Hamilton Wrought Steel Track..... 55
 Interstate..... 60
 Kidder's..... 60
 Lane's New Standard..... 60
 Lane's Parlor..... 40
 Lane's Standard..... 50
 Lundy, Steel Parlor..... 40
 Magic..... 45
 Matchless..... 50
 Moody..... 35
 Moore's Baggage Car Door..... 35
 Moore's Elevator..... 35
 Moore's Railroad..... 55
 Nickel, Steel, Nos. 0, 25; 1, 20; 2, 15..... 40
 Orleans Steel..... 55
 Paragon Nos. 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100..... 20
 Pendulum, Payson's..... 40
 Perfection, Payson's..... 50
 Richards..... 30
 Samson Steel Anti-Friction..... 55
 Star..... 40
 Stearns' Anti-Friction..... 20
 Stearns' Challenge..... 25
 Sterling..... 50
 Terry's Ideal..... 50
 Terry's Modern..... 50
 Terry's Shield..... 50
 Terry's Solid..... 50
 Terry's Wrought Single Strap..... 50
 Victor, No. 1, \$1.00; No. 2, \$1.50; No. 3, \$1.80..... 60
 Warner's Pat..... 20
 Wild West..... 45
 Zenith for Wood Track..... 55

Harness Snaps—See Snaps.
Hatchets—
 American Axe and Tool Co.....
 Blood's.....
 Hunt's.....
 Ludd's.....
 Mann's.....
 Peck's.....
 Underhill's.....
 C. Hammond & Son.....
 Fayette R. Plumb.....
 Collins.....
 Buffalo Hammer.....
 Kelly's.....
 P. S. & W. Co.....
 Sargent's & Co.....
 Schulte, Lohoff & Co.....
 Ten Eyck Edge Tool Co.....

Hay and Straw Knives
 See Knives.

Hinges—
Blind Hinges—

Clark's Nos. 1, 3, 5, 1868, Old Pattern..... 75
 Nos. 1 and 3, Tip Pattern..... 75
 No. 50, Buffalo Noiseless..... 40
 and 65
 Buffalo Reversible, Nos. 3, 2, 1, 1/2, 1 and 0..... 70
 No. 1, Cottage, for wood only..... 80
 No. 1, Diamond, for wood only..... 80
 Dixie L. & P. Nos. 3, 2, 1, 1/2, 1, 0, 00, 4 and 5..... 75
 No. 25, Empire Reversible..... 75
 Lull & Porter, Nos. 3, 2, 1, 1/2, 1, 0, 0, 4 and 5..... 75
 Mortise Gravity, Nos. 2, 4, 4, 6, 8, 9, and 10..... 50
 Huffer..... 50
 Carter, Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50..... 10
 Reading's Gravity..... 75
 Sargent's, Nos. 1, 3, 5, 11, 12, 15..... 75

Gate Hinges—

Automatic..... 50
 Clark's, Nos. 1, 2, 3..... 60
 N. E. Reversible..... 60
 N. E. Reversible..... 60
 N. Y. State..... 60
 Western..... 60

Spring Hinges—

Acme..... 30
 American, Gem and Star..... 30
 Barker's Patent Chisel..... 15
 Barker's Double Acting..... 25
 Bommer's Janned..... 35
 Bommer's All other Kinds..... 30
 Buckman's..... 15
 Champion..... 60
 Chicago..... 60
 J. G. Covered, per doz..... 13
 Empire and Crown..... 20
 Freeport..... 12
 Geer's Spring and Blank Butts..... 40
 Hero and Monarch..... 55
 Ideal No. 3..... 10
 J. G. Covered, per doz..... 13
 New Idea Nos. 1 and 10, per gross \$13.00
 New Idea Dbl. Acting..... 45
 No. 10 Matchless..... 60
 No. 25 Unbreakable..... 60
 Oxford..... 20
 Reliable..... 60
 T. G. Covered, per doz..... 13
 Royal..... 60
 Samson..... 60
 Stearns' Noiseless Floor Hinge, set, \$5.00..... 20
 Union Mfg. Co..... 25
 Union Spring Hinge Co's list, March, 1889..... 25
 U. S. S..... 25
 Wiles, No. 1, per gross, \$18; No. 2..... 13

Wrought Iron Hinges—

List February 14, 1891.
 Castigated Strap and T..... 60
 Strap and T..... 60
 Flat Hinges, 8, 10 & 12 in..... 5
 "Providence" over 12 in..... 4
 Rolled Blind Hinges, Nos. 32 and 34..... 50
 Rolled Blind Hinges, Nos. 232 and 234..... 50
 Rolled Plate..... 70
 Rolled Raised..... 70
 Screw Hook and Eye..... 10
 Screw Hook and Eye..... 10
 Strap..... 22

Hoes—

Am. Axe and Tool Co., S. & O. Pat..... 60
 Sandusky Tool Co., S. & O. Pat..... 60
 Chattanooga Tool Co., S. & O. Pat..... 60
 D. & H. Scovill..... 20
 Grub..... 60
 Lane's Crescent, Planters' Pattern..... 45
 Lane's Razor Blade, Scovill Pattern..... 30
 Maynard, S. & O. Pat..... 45
Handled—
 Garden, Mortar, &c..... 70
 Magic..... 40
 Planter's, Cotton, &c..... 70
 Warren Hoe..... 60

Hog Rings and Rings—

See Rings and Rings—
Holisting Apparatus—
 See Machines, Holisting.

Hollow-Ware—
 See Ware, Hollow.

Holders—

Sprengle's Pat..... 18

Blit—

Angular..... 24
 Diagonal..... 24
 Kensington..... 40
 Barber's..... 15
 Ives..... 20

File and Tool—

Bals Pat..... 40
 Nicholson File Holders..... 20

Sash—

Motley's Adj. Sash, Medium Size..... 120
 Sash..... 120

Hooks—

Cast Iron.....
 Bird Cage, Reading..... 60
 Hro Cage, Sargent's list..... 60
 Clothes Line, Sargent's list..... 55
 Clothes Line, Moore's..... 70
 Clothes Line, Reading list..... 60
 Coat and Hat, Moore's..... 60
 Coat and Hat, Reading..... 60
 Coat and Hat, Sargent's list..... 60
 Hammock, E. C. Stearns & Co., per doz..... 40
 Harness, Reading list..... 55

Wire—
 Atlas, Coat and Hat..... 65
 Belt..... 80
 Handy Hat and Coat..... 50
 Indestructible Coat and Hat..... 45
 Steady Ceiling Hooks..... 50
 Williamson's Bird Cage Hooks, List April, 1892..... 40
 Wire Coat and Hat, Gem, List April, 1889..... 60
 Wire Coat and Hat, Miles, List April, 1889..... 50
 Wire Coat and Hat, Standard..... 60
 Bright Wire Goods—See Wire.

Wrought Iron—

Cotton..... 125
 Cotton Pat. (N. Y. Mallet and Handle) Wks..... 30
 Tassel and Picture, T. & S. Mfg. Co..... 50
 Wrought Staples Hooks, &c..... See Wrought Goods

Miscellaneous—

Bush..... 55
 Fish Hooks, American..... 50
 Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25
 Hooks and Eyes—Brass..... 60
 Hooks and Eyes—Malleable Iron..... 70
 Noll's Grass..... 70
 Whitetree—Patent..... 55
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes—
 See Shoes, Horse.

Hose, Rubber—

Competition, Fair quality..... 75
 Competition, Low Grade..... 80
 Extra..... 80
 N. Y. B. & P. Co., Dundee..... 60
 N. Y. B. & P. Co., Extra..... 40
 N. Y. B. & P. Co., Para..... 25
 Standard..... 70
 Cotton Garden, 1/4 in., coupled..... 7
 Good quality, per doz..... 34

Huskers—

Blair's Adjustable..... 80
 Blair's Adjustable Clipper..... 70
 Hubbard's Solid Steel..... 45

Indurated Fiber Ware—
 See Ware, Indurated Fiber.

Iron, Curling—

Nicol's Patent Curling Iron Heater..... 100
 Silver Tipped Grace Darling Curling Iron, per doz..... 1.75
 No. 66..... 50
 No. 67, Mustache..... 1.25

Sad—

From 4 to 10, at factory..... 100
 B. B. Sad Irons, per doz..... 2.30
 China Lid, Sad Iron (N.E. Butt Co.)..... 15
 Crown Improved..... 60
 Ideal Irons, new list..... 50
 Mahony's Troy Pot. Irons..... 25
 Mrs. Potts' Sad Irons, per set:
 Small lots..... 50 55 60 65
 National Self-Heating..... 54
 New England..... 20
 Salamander Irons..... 25
 Self-Heating..... 30
 Self-Heating Tailors..... 18
 Sensible, list Jan. 91..... 50
 Sensible Tailors' Irons..... 35

Soldering—

Soldering Coppers..... 19
 Covert's Adjustable, list Jan. 1, 1889..... 25

Tinker's Dread— per doz \$1.75; per gross \$18

Pinking—

Pinking Irons, per doz, 65&60.

Jack Screws—See Screws.

Jacks, Wagon—

Daisy..... 33
 Lockport..... 40
 Victor..... 33

Kettles—

Brass, Spun, Plain, list Jan. 1, '91, 25&25
 Brass, Spun, Pld W.M. list Jan. 1, '91, 20
 Stamped Brass Kettles..... 21
 Enamelled and Tea—See Ware, Hollow.

Keys—

Look, Ass'n list Dec. 30, 1886, 65&1070
 Eagle, Cabinet, &c..... 33
 Hotchkiss' Brass Blanks..... 40
 Hotchkiss' Copper and Tinned..... 40
 Hotchkiss' Pad, and Cab..... 35
 Wollensak Tinned..... 60

Knife Sharpeners—
 See Sharpeners, Knife.

Knives—

Butcher, Shoe, &c.....
 Ames' Bread Knives, per doz \$1.50, 15&20
 Ames' Butcher Knives..... 25
 Wm. B. Knives..... 25
 Foster Bros' Butcher, &c..... 40
 Jordan's AA A1 Butchers', list..... net
 Moran's Shoe and Bread..... 20
 Nichols' Butcher Knives..... 40
 Wilson's Butcher Knives, list Dec 8, 1890..... 25

W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.80, &c.
 Hay and Straw—See Hay Knives.
 Table and Pocket—See Cutlery.

Corn—

Bradley's..... 10
 Wadsworth's..... 25

Mix.—

New Haven..... 75
 F. S. & W..... 75
 Wm. B. Knives..... 25
 Adjustable Handle..... 25
 Bradley's..... 35
 Douglass..... 75
 Merrill..... 60
 Watrous..... 15
 L. & J. White..... 20
 Wilkinson's Folding..... 25

Hay and Straw—

Carter's Needle..... 110
 Heath's..... 130
 Lightning, from jobbers..... 50
 Noll's Hay..... 70
 Wadsworth's..... 40

Mincing—

Am. (2d quality), per gr. 1 blade, \$7; 2 blades, \$12; 3 blades, \$18..... net
 Buffalo Adjustable..... 30
 Knapp & Cowles..... 50
 Lottrop's..... 20
 Smith's, per doz, Single, \$2; Double \$3..... 45

Knobs—

Bardsley's Wood Door, Shutter, &c..... 15
 Base, Rubber Tip..... 70
 Carriage, Jap..... 80
 Door, Mineral..... 60
 Door, Por. Jap..... 70
 Door, Por. Nickel..... 25
 Door, Por. Plated Nickel..... 25
 Drawer, Porcelain..... 60
 Hemacite Door Knobs..... 40
 Picture, Hemacite..... 35
 Picture, Jap..... 60
 Picture, Sargent's..... 70
 Shutter, Porcelain..... 65
 Yale & Towne Wood, list Dec., 1885..... 40

Ladders.

Davies Extension and Single..... 20

Ladies—

Melting, P. S. & W..... 35
 Melting, Reading..... 35
 Melting..... 60
 Melting, Warner's..... 30

Lanterns—

Tubular—
 Anti-Friction, with Guard..... 45
 Brass Plated, Sq. Lift, Guard..... 50
 Con. Plated, Sq. Lift, Guard..... 50
 Con. with Guard..... 35
 Regular, with Guard..... 35
 Side Lift, with Guard..... 40
 Square Lift, with Guard..... 45

Bull's Eye Police—

2 1/2-inch flash light..... 40
 3-inch flash light..... 45
 2 1/2-inch regular..... 35
 3-inch regular..... 35

Lawn Mowers—

See Mowers, Lawn.

Leaders, Cattle—

Hotchkiss..... 30
 Humason, Beckley & Co's..... 70
 Peck, Stow & W. Co..... 60
 Sargent's..... 70

Lemon Squeezers—
 See Squeezers, Lemon.

Lifters, Transom—

Beardsley & Mouat, Sure Grip..... 50
 Excelsior..... 50
 Payson's..... 60
 Imperial..... 60
 Solid Grip..... 60
 Universal..... 60
 Reiter's, list Feb. 20, 1891..... 30
 Brass, Real Bronze or Nickel Plate..... 30
 Bronzed Iron Rods..... 60
 Shaw's..... 60
 Wollensak's..... 50
 Class 3 and 4, Brass..... 50
 Class 3 and 4, Bronzed Iron..... 60
 Class 3 and 4, Bronze Metal..... 50
 Skylight Lifters..... 25

Lines—

Chalk..... 60
 Cotton and Linen Fish..... 50
 Cotton Chalk..... 55
 Mason's Colored Cotton..... 45
 Mason's Linen, 34 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25..... 25
 Mason's Linen, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50..... 25
 Ossavan Mills..... 50
 Braided Chalk..... 50
 Cotton Clothes Lines..... 16
 Solid Braided Ventilator and Mason's Lines..... 25
 Twisted Chalk..... 60
 Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50..... 10

Silver Lark, Braided No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50..... 25

Ventilator Cord, Samson Braided, White or Drab Cotton, per doz \$7.50, 20

Wire Clothes, Nos. 18 19 20 100 ft. \$3.50 \$3.00 \$2.50

Links, Open—

Terry's—per gross:
 Nos..... 1 2 3 4
 \$6.00 8.00 12.00 16.00

Locks, &c.—

Cabinet—

Eagle, Gaylord Par. list, March '84, rev. for Corbin..... Jan. 1, '85, 33&42
 Barnes Mfg. Co..... 40
 Delta, Nos. 38 to 39..... 40
 Delta, Nos. 51 to 63..... 40
 Delta, Nos. 87 to 98..... 30
 Champion Night Latches..... 40
 Eagle and Corbin Trunk..... 25
 Champion Cab. and Combin..... 33
 Romer's..... 25
 Yale..... net prices

Door, Locks, Latches, &c.—

Barnes Mfg. Co..... 40
 Britain, Graham & Mathes, list Jan. 1890..... 60
 Brooklyn Latches..... 50
 Deltz, list at &c..... 30
 Mallory, Wheeler & Co. list July, '88..... 60

Plate.....33¢
 Romer's Night Latches.....16¢
 R. & L. Mfg. Co., ust Mar. 20, 1888.....
 Sargent & Co., Ltd. Atg. 1. 1/2¢. 50¢10¢70¢
 Warner's Burglar Proof. # doz. \$4.00, 50¢
 Yale.....net prices

Elevator—

Moore's.....33¢

Padlocks—

Wrought Iron Padlocks:
 Brittan, Graham & Mathes, list June 10, 1891.....50¢2¢
 Mallory, Wheeler Co., list January 1, 1894.....75¢
 Norwich Lock Mfg. Co., list June 10, 1891.....50¢2¢
 Russell & Erwin Mfg. Co., list June 10, 1891.....50¢2¢
 Sargent & Co., list January 1, 1894.....75¢
 William Wilcox Mfg. Co., list January 1, 1894.....75¢20¢
 Ames Sword Co. up to No. 150.....40¢
 Ames Sword Co. above No. 150.....50¢
 Barnes Mfg. Co.....40¢40¢10¢
 Champion Padlocks.....40¢
 A. B. Delta.....40¢
 Eagle.....40¢
 Eureka, Eagle Lock Co.....40¢2¢
 E. T. Fram's Keystone Scandinavian, 1010 line.....80¢40¢
 120 line.....90¢85¢
 109 line.....90¢85¢
 510 line.....70¢10¢
 225, 610 and 209 lines.....70¢
 All other numbers.....50¢50¢
 Horseshoe.....# doz \$9, 50¢50¢10¢
 Hotchkiss.....30¢
 Nock's.....30¢
 Romer's Nos. 0 to 91.....30¢
 Romer's Scandinavian, &c., Nos. 100 to 505.....15¢
 Scandinavian.....90¢50¢
 Slaymaker, Barry & Co.....90¢50¢
 No. 1010 line.....90¢50¢
 No. 41 line.....60¢
 No. 81 line.....60¢
 No. 21 line.....80¢
 Star.....60¢
 Yale Lock Mfg. Co.'s.....net prices

Sash, &c.—

Attwell Mfg. Co.....25¢33¢4¢
 Champion Safety list January, 1893, 70¢50¢
 Clark's no. 1, \$10; No. 2, \$8 * gr.....33¢
 Common Sense, Jap'd, Cop'd and Brzd.....# gr \$4.00
 Common Sense, Nickel Plated.....# gr \$10.00
 Corbin's Daisy, list Feb. 15, 1888.....70¢
 Davis Bronze, Barnes Mfg. Co.....80¢
 Ferguson's.....33¢4¢
 Fish (Liesche's pat.), No. 100, # gr.....50¢
 No. 105, # gr, \$10.....70¢35¢
 Giant, list Jan. 1892.....70¢35¢
 Hammond's Window Springs.....40¢
 Hugunin's New Sash Locks.....25¢25¢2¢
 Hugunin's Sash Balances.....25¢25¢2¢
 Ives' Patent.....60¢10¢50¢10¢10¢
 Kempshall's.....60¢60¢10¢10¢
 Kempshall's Model.....60¢60¢10¢10¢
 Monarch.....50¢
 Payson's Perfect.....60¢10¢10¢10¢
 Reading.....60¢10¢60¢10¢10¢
 Security.....70¢
 Universal.....30¢
 Victor.....60¢10¢10¢
 Walker's.....60¢10¢10¢
 Wolcott's.....60¢10¢5¢

Lumber Tools—

see tools, Lumber.

Lustro—

Four-ounce bottles.....# doz, \$1.75; # gross.....\$17.00

Machines.

Boring—

Without Augers. Upright. Angular.
 Boss, Carpenters' 3.00
 Boss, Ship Bldrs' 3.85
 Douglas.....\$5.50 \$6.75.....50¢
 Jennings'.....5.50 6.75.....50¢50¢5¢
 Millers Falls.....7.50.....25¢
 Phillips' Patent with Auger.....7.00 7.50.....
 Snell's, Rice's Pat 5.50 6.75.....40¢10¢10¢

Fluting—

American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35¢
 Combined Fluter and Sad Iron.....35¢
 Crown, 4 1/4 in., \$3.50; 6 in., \$4.00; 8 in., \$6.50 each.....30¢
 Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....30¢
 Crown Jewel, 6 in.....\$3.50 each, 35¢
 Domestic Fluter.....each, \$1.50
 Eagle, 6 1/4-inch Rolls, \$2.15.....35¢
 Eagle, 6 1/4-inch Roller, \$2.35.....35¢
 Geneva Hand Fluter, White Metal.....# doz \$12, 25¢
 Knox, 4 1/4-inch Rolls.....\$3.25 each 35¢
 Knox, 6-inch Rolls.....\$3.80 each 35¢
 Shepard Hand Fluter, No. 85, per doz \$15.00.....40¢
 Shepard Hand Fluter, No. 95, # doz \$15.00.....40¢
 Shepard Hand Fluter, No. 110, # doz \$11.00.....40¢

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....20¢
 Moore's Hand Hoist, with Lock Brake 20¢
 Moore's Rope Differential Pulley Block.....80¢
 Maris & Beekley (Teal Patent).....30¢
 See also Blocks.

Washing—

Fair and Square.....# doz \$42.00
 Anthony Wayne, # doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.
 Wayne American.....# doz \$36.00
 Welcott.....# doz \$34.00
 Western Star # doz, No. 2, \$36; No. 3 \$39

Mallets—

B. & L. Block Co., Hickory & L. V.....30¢30¢10¢
 Hickory.....20¢10¢20¢10¢10¢
 Lignumvite.....20¢10¢20¢10¢10¢

Mattocks—Regular list.

Standard Fibreware, No. 1, peck #

dozen, \$3.50; 1/2-peck, \$3.90

Meat Cutters—

See Cutters, Meat.

Menders, Harness—

Per doz.....\$2. 0

Milk Cans—See Cans, Milk.

Mills—

Coffee—

Box and Slide, list Jan. 1, 1888, 60¢60¢5¢

Net prices are often made which are lower than above discount.

American, Enterprise Mfg. Co., list Jan. 17, 1893.....20¢

The Swift, Lane Bros.....30¢

Wadell's New Box Mills, Ideal Brand, New List.....60¢

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Out of Season.

Muzzles—

Safety.....# doz, \$3.00, 25¢

Nails.—

Cut and Wire. See Trade Report.

Wire Nails, Papered.

Association list, May 1, '92.....85¢5¢

Tack Mfrs' list.....70¢60¢70¢10¢

Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos. 6 7 8 9 10

A. C.....25¢ 23¢ 22¢ 21¢ 21¢

American.....9¢ 9¢ 9¢ 9¢ 9¢.....40¢10¢

Anchor.....23¢ 21¢ 20¢ 19¢ 18¢.....35¢

Ausable.....23¢ 20¢ 20¢ 24¢ 23¢.....40¢25¢

Capwell.....19¢ 18¢ 17¢ 16¢ 16¢.....10¢25¢

C. B. K.....25¢ 23¢ 22¢ 21¢ 21¢.....40¢

Champion.....25¢ 23¢ 22¢ 21¢ 20¢.....40¢10¢10¢

Champlain.....23¢ 20¢ 20¢ 24¢ 23¢.....40¢25¢

Clinton, Fin.....19¢ 17¢ 16¢ 15¢ 14¢.....30¢25¢

Empire Bronzed.....13¢14¢ 14¢ 13¢

Essex.....23¢ 21¢ 20¢ 24¢ 23¢.....40¢10¢50¢

Lyra.....9¢ 9¢ 9¢ 9¢ 9¢.....net

Maud S.....25¢ 23¢ 22¢ 21¢ 21¢.....50¢10¢50¢

Northwest'n.....25¢ 23¢ 22¢ 21¢ 20¢.....25¢25¢5¢

Putnam.....23¢ 21¢ 20¢ 19¢ 18¢.....15¢

Snowden.....9¢ 9¢ 9¢ 9¢ 9¢.....net

Standard.....23¢ 21¢ 20¢ 19¢ 18¢.....35¢

Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢.....25¢

Western.....23¢ 21¢ 20¢ 19¢ 18¢.....50¢

Picture—

Brass Head, Combination list.....50¢10¢

Brass Head, Sargent's list.....60¢60¢10¢

Porcelain Head, Combination list.....40¢10¢

Porcelain Head, Sargent's list.....50¢10¢10¢

Niles' Patent.....40¢

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square, Hex.

Cold Punched.....5.00¢ 5.10¢ off list

In packages of 100 lb, add 1.10¢ # lb, net; in packages less than 100 lb, add 1/4¢ # lb, net.

Hot Pressed.....5.80¢ 6.50¢ off list

Oakum—

Best or Government.....# lb 6¢47¢4¢

Navy.....# lb 5¢45¢5¢

U. S. Navy.....# lb 5¢44¢6¢

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper.....50¢10¢50¢10¢5¢

Zinc and Tin.....60¢10¢70¢85¢

Broughton's Brass.....50¢

Broughton's Zinc.....60¢

Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 # doz.....10¢10¢5¢

Malleable, Hammers' Old Pattern, same list.....45¢

Olstead's Brass and Copper.....50¢

Olstead's Tin and Zinc.....60¢

Prior's Pat. or "Paragon" Brass.....60¢

Prior's Pat. or "Paragon" Zinc.....60¢10¢10¢

Steel, Draper & Williams.....50¢

Wilmot & Hobbs Mfg. Co., Steel Anti-Rust.....60¢

Openers, Can—

American.....# gross \$1.75¢\$2.00

Champion.....# doz \$2.00.....45¢

Domestic.....# doz \$2.00.....45¢

Duplex.....# doz 25¢, 15¢20¢

Eureka.....# doz \$2.50, 10¢

Excelsior, No. 1 \$2.50; No. 2, \$1.50.....40¢

Lyman's.....# doz \$3.75, 20¢

Messenger's Comet.....# doz \$3.00, 25¢

No. 4, French.....# doz \$2.25, 55¢60¢

No. 5, Iron Handle.....# gr \$8.00, 45¢60¢

Sardine Sissors.....# doz \$2.75\$3.00

Sprague, No. 1, 55¢; 2, 60¢; 3, 65¢.....# doz \$2.75

Star.....# doz \$3.00.....55¢25¢

Universal.....# doz \$3.00, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50¢10¢

Packing, Steam—

Rubber—

Standard, fair quality.....70¢70¢10¢

Superior quality.....75¢80¢

Extra.....60¢60¢85¢

Jenkins' Standard, # lb 80¢.....25¢25¢25¢

N. Y. B. & P. Co., Empire.....80¢

N. Y. B. & P. Co., Salamander.....25¢

N. Y. B. & P. Co., Standard.....50¢

Miscellaneous

American Packing.....10¢11¢ 11¢ 10¢

Cotton Packing.....15¢17¢ 17¢ 15¢

Italian Packing.....18¢14¢ 14¢ 18¢

Jute.....7¢8¢ 8¢ 7¢

Russia Packing.....14¢# lb

Palls—

Creamery—

S. S. & Co.: 18-qt., \$7.00; 20-qt., \$7.25

doz.....5¢

Galvanized—

Quarts 10 12 14

Central Stamping Co.....2.50 2.75 3.00

Fire Buckets.....2.75 3.25 3.75

Hills Heavy Weight, # doz. \$2.75 8.00 8.25

Hills Light Weight, # doz. \$2.75 8.00 8.25

Iron Clad.....2.50 2.75 3.00

Sidney Shepard & Co.....2.50 2.75 3.00

Buckets—See Well Buckets.

Indurated Fiber Ware

Fire Palls, deep.....# doz \$4.80

Fire Palls, round bottom.....# doz \$5.40

Milk, 14 qt.....# doz \$5.40

Stable, 14 qt.....# doz \$6.00

Star Palls, 12 qt.....# doz \$4.20

Standard Fiber Ware—

Buggy Palls.....\$3.00

Chamberlain, 14 qt.....# doz \$7.00

Dairy Palls, 14 qt.....# doz 3.75 4.25

Fire Palls, No. 1, 12 qt., # doz 3.75

Fire Palls, No. 2, 14 qt., # doz 4.25

Horse Palls.....4.00

Slop Jars (bal. trap).....7.50 8.50

Sugar Palls.....5.00 5.50

Water Palls, 12 qt., # doz. 9.15 9.75

Pans—

Dripping—

Large sizes.....# lb 5¢

Small sizes.....# lb 5¢

Silver & Co. (Covered).....40¢

Fry—

Standard List:

No. 1.....1 2 3 4

doz.....\$3.00 \$3.75 \$4.25 4.75 \$5.25

No. 2.....5 6 7 8

doz.....\$6.00 \$7.00 \$8.00 \$9.00

Polished, regular goods.....75¢75¢10¢

Acme Fry Pans.....60¢95¢

Dust—

Steel Edge, No. 1.....# doz \$1.75

Roasting and Baking—

Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each.....60¢10¢

Paper and Cloth—

Sand and Emery—

List April 19, 1886.....50¢10¢50¢10¢10¢

Sibley's Emery and Crocus Cloth.....30¢

Parers—

Apple—

Advance.....# doz \$4.75

Baldwin.....# doz 5.25

Bonanza.....each 5.00

Daisy.....each 4.00

Dandy.....each 7.50

Eclipse.....# doz 4.00

Eureka, 1888.....each 16.00

Family Bay State.....# doz 12.00

Favorite.....# doz 5.00

Gold Medal.....# doz 4.00

Improved Bay State.....# doz 4.00

Little Star.....# doz 4.50

Monarch.....# doz 13.50

Pullers Nail—

Ellipse..... 7 doz., \$24.00, 40%
 Economy..... 7 doz., \$24.00, 40%
 Giant, No. 1..... 7 doz., \$18.00, 10%
 Giant, No. 2..... 7 doz., \$15.00, 10%
 Pelican..... 7 doz., \$9.00, 25%
 Scranton..... 7 doz., \$18.00, 33 1/3%

Pulleys—

Brass Screw, Anti-Friction, 5 in. lid, \$5.70..... 50%
 Hay Fork, "F" Common and Patent Bushed..... 20%
 Hay Fork, Moore's Anti-Friction 5 in. Wheel, 7 doz., \$12.00..... 40%
 Hay Fork, Reed's Self-Lubricating..... 60%
 Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50..... 50%
 Hay Fork, Tarbox Pat. Iron..... 20%
 Hot House, Awning, &c..... 60%
 Japanned Clothes Line..... 60%
 Japanned Side..... 60%
 Moore's Ceiling or End, Anti-Friction..... 40%
 Moore's Dumb Waiter, Anti-Friction..... 50%
 Moore's Electric Light..... 33 1/3%
 Moore's Side, Anti-Friction..... 50%
 Sash (Auger Mortise)..... 60%
 Common Sense..... 60%
 Acme..... 60%
 Ideal, Nos. 2, 4, 10 & 15..... 30% less 1¢ doz net.
 On bbl. lots extra 5%..... 45%
 Shade Rack..... 45%
 Shepard's Niagara, No. 25..... 25¢ doz net
 Tackle Blocks—See Blocks.

Pumps—

Clister, Best Makers..... 60%
 Pitcher Spout, Best Makers..... 60%
 Pitcher Spout, Cheaper G'ds..... 60%
 Myers' Pumps, low list..... 50%

Punches—

Avery's Revolving..... 40%
 Avery's Sawset and Punches..... 40%
 Bemis & Call Co.'s Cast Steel Drive..... 50%
 Bemis & Call Co.'s Check..... 50%
 Bemis & Call Co.'s Spring..... 50%
 Bemis & Call Co.'s Springfield Socket..... 50%
 Niagara Hollow Punches..... 20%
 Niagara Solid Punches..... 15%
 Rice and Punches..... 15%
 Saddle's or Drive, good..... 20%
 Spring, good quality..... 20%
 Spring, Leach's Pat..... 15%
 Solid Timmers', P., S. & W. Co., 7 doz., \$1.44..... 55%
 Timmers' Hollow Punches, P., S. & W. Co..... 20%
 Co..... 20%

Rail—

Barn Door, Light, In. 1/2, 2 1/2, 3 1/2, 4 1/2, 5 1/2, 6 1/2, 7 1/2, 8 1/2, 9 1/2, 10 1/2, 11 1/2, 12 1/2, 13 1/2, 14 1/2, 15 1/2, 16 1/2, 17 1/2, 18 1/2, 19 1/2, 20 1/2, 21 1/2, 22 1/2, 23 1/2, 24 1/2, 25 1/2, 26 1/2, 27 1/2, 28 1/2, 29 1/2, 30 1/2, 31 1/2, 32 1/2, 33 1/2, 34 1/2, 35 1/2, 36 1/2, 37 1/2, 38 1/2, 39 1/2, 40 1/2, 41 1/2, 42 1/2, 43 1/2, 44 1/2, 45 1/2, 46 1/2, 47 1/2, 48 1/2, 49 1/2, 50 1/2, 51 1/2, 52 1/2, 53 1/2, 54 1/2, 55 1/2, 56 1/2, 57 1/2, 58 1/2, 59 1/2, 60 1/2, 61 1/2, 62 1/2, 63 1/2, 64 1/2, 65 1/2, 66 1/2, 67 1/2, 68 1/2, 69 1/2, 70 1/2, 71 1/2, 72 1/2, 73 1/2, 74 1/2, 75 1/2, 76 1/2, 77 1/2, 78 1/2, 79 1/2, 80 1/2, 81 1/2, 82 1/2, 83 1/2, 84 1/2, 85 1/2, 86 1/2, 87 1/2, 88 1/2, 89 1/2, 90 1/2, 91 1/2, 92 1/2, 93 1/2, 94 1/2, 95 1/2, 96 1/2, 97 1/2, 98 1/2, 99 1/2, 100 1/2, 101 1/2, 102 1/2, 103 1/2, 104 1/2, 105 1/2, 106 1/2, 107 1/2, 108 1/2, 109 1/2, 110 1/2, 111 1/2, 112 1/2, 113 1/2, 114 1/2, 115 1/2, 116 1/2, 117 1/2, 118 1/2, 119 1/2, 120 1/2, 121 1/2, 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788 1/2, 789 1/2, 790 1/2, 791 1/2, 792 1/2, 793 1/2, 794 1/2, 795 1/2, 796 1/2, 797 1/2, 798 1/2, 799 1/2, 800 1/2, 801 1/2, 802 1/2, 803 1/2, 804 1/2, 805 1/2, 806 1/2, 807 1/2, 808 1/2, 809 1/2, 810 1/2, 811 1/2, 812 1/2, 813 1/2, 814 1/2, 815 1/2, 816 1/2, 817 1/2, 818 1/2, 819 1/2, 820 1/2, 821 1/2, 822 1/2, 823 1/2, 824 1/2, 825 1/2, 826 1/2, 827 1/2, 828 1/2, 829 1/2, 830 1/2, 831 1/2, 832 1/2, 833 1/2, 834 1/2, 835 1/2, 836 1/2, 837 1/2, 838 1/2, 839 1/2, 840 1/2, 841 1/2, 842 1/2, 843 1/2, 844 1/2, 845 1/2, 846 1/2, 847 1/2, 848 1/2, 849 1/2, 850 1/2, 851 1/2, 852 1/2, 853 1/2, 854 1/2, 855 1/2, 856 1/2, 857 1/2, 858 1/2, 859 1/2, 860 1/2, 861 1/2, 862 1/2, 863 1/2, 864 1/2, 865 1/2, 866 1/2, 867 1/2, 868 1/2, 869 1/2, 870 1/2, 871 1/2, 872 1/2, 873 1/2, 874 1/2, 875 1/2, 876 1/2, 877 1/2, 878 1/2, 879 1/2, 880 1/2, 881 1/2, 882 1/2, 883 1/2, 884 1/2, 885 1/2, 886 1/2, 887 1/2, 888 1/2, 889 1/2, 890 1/2, 891 1/2, 892 1/2, 893 1/2, 894 1/2, 895 1/2, 896 1/2, 897 1/2, 898 1/2, 899 1/2, 900 1/2, 901 1/2, 902 1/2, 903 1/2, 904 1/2, 905 1/2, 906 1/2, 907 1/2, 908 1/2, 909 1/2, 910 1/2, 911 1/2, 912 1/2, 913 1/2, 914 1/2, 915 1/2, 916 1/2, 917 1/2, 918 1/2, 919 1/2, 920 1/2, 921 1/2, 922 1/2, 923 1/2, 924 1/2, 925 1/2, 926 1/2, 927 1/2, 928 1/2, 929 1/2, 930 1/2, 931 1/2, 932 1/2, 933 1/2, 934 1/2, 935 1/2, 936 1/2, 937 1/2, 938 1/2, 939 1/2, 940 1/2, 941 1/2, 942 1/2, 943 1/2, 944 1/2, 945 1/2, 946 1/2, 947 1/2, 948 1/2, 949 1/2, 950 1/2, 951 1/2, 952 1/2, 953 1/2, 954 1/2, 955 1/2, 956 1/2, 957 1/2, 958 1/2, 959 1/2, 960 1/2, 961 1/2, 962 1/2, 963 1/2, 964 1/2, 965 1/2, 966 1/2, 967 1/2, 968 1/2, 969 1/2, 970 1/2, 971 1/2, 972 1/2, 973 1/2, 974 1/2, 975 1/2, 976 1/2, 977 1/2, 978 1/2, 979 1/2, 980 1/2, 981 1/2, 982 1/2, 983 1/2, 984 1/2, 985 1/2, 986 1/2, 987 1/2, 988 1/2, 989 1/2, 990 1/2, 991 1/2, 992 1/2, 993 1/2, 994 1/2, 995 1/2, 996 1/2, 997 1/2, 998 1/2, 999 1/2, 1000 1/2, 1001 1/2, 1002 1/2, 1003 1/2, 1004 1/2, 1005 1/2, 1006 1/2, 1007 1/2, 1008 1/2, 1009 1/2, 1010 1/2, 1011 1/2, 1012 1/2, 1013 1/2, 1014 1/2, 1015 1/2, 1016 1/2, 1017 1/2, 1018 1/2, 1019 1/2, 1020 1/2, 1021 1/2, 1022 1/2, 1023 1/2, 1024 1/2, 1025 1/2, 1026 1/2, 1027 1/2, 1028 1/2, 1029 1/2, 1030 1/2, 1031 1/2, 1032 1/2, 1033 1/2, 1034 1/2, 1035 1/2, 1036 1/2, 1037 1/2, 1038 1/2, 1039 1/2, 1040 1/2, 1041 1/2, 1042 1/2, 1043 1/2, 1044 1/2, 1045 1/2, 1046 1/2, 1047 1/2, 1048 1/2, 1049 1/2, 1050 1/2, 1051 1/2, 1052 1/2, 1053 1/2, 1054 1/2, 1055 1/2, 1056 1/2, 1057 1/2, 1058 1/2, 1059 1/2, 1060 1/2, 1061 1/2, 1062 1/2, 1063 1/2, 1064 1/2, 1065 1/2, 1066 1/2, 1067 1/2, 1068 1/2, 1069 1/2, 1070 1/2, 1071 1/2, 1072 1/2, 1073 1/2, 1074 1/2, 1075 1/2, 1076 1/2, 1077 1/2, 1078 1/2, 1079 1/2, 1080 1/2, 1081 1/2, 1082 1/2, 1083 1/2, 1084 1/2, 1085 1/2, 1086 1/2, 1087 1/2, 1088 1/2, 1089 1/2, 1090 1/2, 1091 1/2, 1092 1/2, 1093 1/2, 1094 1/2, 1095 1/2, 1096 1/2, 1097 1/2, 1098 1/2, 1099 1/2, 1100 1/2, 1101 1/2, 1102 1/2, 1103 1/2, 1104 1/2, 1105 1/2, 1106 1/2, 1107 1/2, 1108 1/2, 1109 1/2, 1110 1/2, 1111 1/2, 1112 1/2, 1113 1/2, 1114 1/2, 1115 1/2, 1116 1/2, 1117 1/2, 1118 1/2, 1119 1/2, 1120 1/2, 1121 1/2, 1122 1/2, 1123 1/2, 1124 1/2, 1125 1/2, 1126 1/2, 1127 1/2, 1128 1/2, 1129 1/2, 1130 1/2, 1131 1/2, 1132 1/2, 1133 1/2, 1134 1/2, 1135 1/2, 1136 1/2, 1137 1/2, 1138 1/2, 1139 1/2, 1140 1/2, 1141 1/2, 1142 1/2, 1143 1/2, 1144 1/2, 1145 1/2, 1146 1/2, 1147 1/2, 1148 1/2, 1149 1/2, 1150 1/2, 1151 1/2, 1152 1/2, 1153 1/2, 1154 1/2, 1155 1/2, 1156 1/2, 1157 1/2, 1158 1/2, 1159 1/2, 1160 1/2, 1161 1/2, 1162 1/2, 1163 1/2, 1164 1/2, 1165 1/2, 1166 1/2, 1167 1/2, 1168 1/2, 1169 1/2, 1170 1/2, 1171 1/2, 1172 1/2, 1173 1/2, 1174 1/2, 1175 1/2, 1176 1/2, 1177 1/2, 1178 1/2, 1179 1/2, 1180 1/2, 1181 1/2, 1182 1/2, 1183 1/2, 1184 1/2, 1185 1/2, 1186 1/2, 1187 1/2, 1188 1/2, 1189 1/2, 1190 1/2, 1191 1/2, 1192 1/2, 1193 1/2, 1194 1/2, 1195 1/2, 1196 1/2, 1197 1/2, 1198 1/2, 1199 1/2, 1200 1/2, 1201 1/2, 1202 1/2, 1203 1/2, 1204 1/2, 1205 1/2, 1206 1/2, 1207 1/2, 1208 1/2, 1209 1/2, 1210 1/2, 1211 1/2, 1212 1/2, 1213 1/2, 12

Whips

American Whip Co.	Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Driving	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone	15.00	16.50	18.00	20.00	.....	.....	.....	.....
Bull Bone, Half-length Whalebone	11.00	12.00	13.00	15.00	.....	.....	.....	.....
American Standard	8.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50
True Grip, Raw Hide Center	6.00	6.00	6.50	7.00	7.50	8.00	.....	.....
New Name, Stocked Java, Black and Wine Colors	6.00	.....	.....	.....	.....
Americus, 93 Pen Whip	6.00	.....	.....	.....	.....
Gents' Light Driving No. 111	6.00	.....	.....	.....	.....
Gents' Light Driving No. 106	5.00	.....	.....	.....	.....
Hand-made Stocked Java No. 103	8.75	4.00	.....	.....	.....	.....	.....
A large variety of cheaper grades
Team Whips
Toy Whips
Hardware Assortment, 10/American, 75 Whips for \$50.00.

Wire and Wire Goods—**Iron—**

Market,	Br. & Ann., Nos. 0 to 18	Extra 5@10% often given and low net prices of often made on large lots.
Br. & Ann., Nos. 0 to 18
Cop'd, Nos. 0 to 18, 75@10% 75@10% 75@10%
Galv., Nos. 0 to 18
Tin'd, Tin'd, Nos. 0 to 18

Ossawan Mills, Brass and Copper on Spools..... 50@10%
 Tate's Spooled, Tin'd & Annealed..... 80@25%
 Tate's Spooled Cop. and Brass..... 50%
 Cast Steel Wire..... 50%
 Stub's Steel Wire..... \$6.00 to 2.30%
 Steel Music Wire, 12 to 30, imported..... 60@70%
 Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list..... 35@10% 10@90%
 Wire Cloth and Netting.....
 Galvanized Wire Netting..... 80@80% 10%

Wire Barb—
 See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable..... 40%
 Baxter's Adjustable "S"..... 40@10% 50%
 Baxter's Diagonal..... 60%
 Coes' Genuine..... 50@50% 10%
 Coes' Mechanics..... 50@10% 25%
 Girard American..... 55@10% 15%
 Lamson & Sessions' Engineers..... 60@10%
 Lamson & Sessions' Standard..... 70@10%
 P. S. & W. Agricultural.....
 Girard Agricultural..... 75@10% 80%
 Lamson & Sessions' Agric'l.....
 W. & B. Diamond.....

Bemis & Call's:
 Pat. Combination Bright..... 40@5%
 Pat. Combination Black..... 40@10%
 Merrick's Eastern..... 45%
 Briggs' Pattern..... 30@10%
 Cylinder or Gas Pipe..... 45@5%
 No. 3 Pipe..... 55%
 Aiken's Pocket (Bright)..... \$8.00, 50@10%
 The Favorite Pocket..... * doz., \$3.00, 40%
 Webster's Pat. Combination..... 25%
 Boardman's..... 25%
 Always Ready..... 25%
 Alligator..... 50%
 Donohue's Engineer..... 20@10%
 Eagle..... 50@10%
 Acme, Bright..... 50@25%
 Acme, Nickle..... 40%
 Hercules..... 70@70%
 Walker's..... 55@5%
 Diamond Steel..... 55@5%
 Cincinnati Brace Wrenches..... 25@10%
 Tafts Vise Wrench..... 55@10% 55%

Wringers, Clothes—

Am. Wringer Co.'s list, July 1, 1893..... 2% cash
 Solby Wringer Co.'s list, Sept. 1, 1893..... 2% cash
 Lovell Mfg. Co.'s list, July 1, 1893..... 2% cash
 Peerless Mfg. Co.'s list, Feb. 1892..... 2% cash
 National Wringer & Mfg. Co., list June 1, 1892..... 2% cash

Wrought Goods—

Staples, Hooks, &c., list, March 17, 1893..... 85@10% 85@10%

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

Linseed, City, raw.....	47
Linseed, City, boiled.....	50
Linseed, Western, raw.....	47
Lard, City, Extra Winter.....	70
Lard, City Prime.....	70
Lard, City, Extra No. 1.....	50
Lard, City, No. 1.....	45
Lard, Western, prime.....	70
Cotton-seed, Crude, prime.....	29
Cotton-seed, Crude, off grades.....	25
Cotton-seed, Summer Yellow, prime.....	36
Cotton-seed, Summer Yellow, off grades.....	34
Sperm, Crude.....	65
Sperm, Natural Spring.....	66
Sperm, Bleached Spring.....	71
Sperm, Natural Winter.....	71
Sperm, Bleached Winter.....	76
Whale, Crude.....	45
Whale, Natural Winter.....	45
Whale, Bleached Winter.....	48
Whale, Extra Bleached.....	50
Sea Elephant, Bleached Winter.....	32
Menhaden, Crude, Sound.....	32
Menhaden, Crude, Southern.....	30
Menhaden, Light Pressed.....	36
Menhaden, Bleached Wter.....	41
Menhaden, Extra Bleached.....	43
Tallow, City, prime.....	50
Tallow, Western, prime.....	48
Cocanut, Ceylon.....	64@ 6
Cod, Domestic.....	38
Cod, Foreign.....	42
Red Elaine.....	35
Red Saponified.....	5
Bank.....	38
Strait.....	38
Olive, Italian, bbls.....	58
Neatsfoot, prime.....	60
Palm, prime, Lagos.....	54@ 6

Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test.....	7 @ 7 1/2
Black, 29 gravity, 15 cold test.....	7 1/2 @ 8
Black, 29 gravity, summer.....	6 @ 8 1/2
Cylinder light, filtered.....	14 @ 16

Cylinder, dark, filtered.....	10 @ 13
Paraffine, 23 1/2 @ 24 gravity.....	11 @ 12
Paraffine, 25 gravity.....	10 @ 11
Paraffine, 28 gravity.....	7 1/2 @ 10
Paraffine, red.....	5 1/2 @ 10 1/2

Paints and Colors—

Barytes, Foreign, 10 ton.....	\$22.00 @ 24.00
Barytes, Amer. floated.....	29.00 @ 32.00
Barytes, Amer. No. 1.....	16.00 @ 18.00
Barytes, Amer. No. 2.....	13.00 @ 15.00
Barytes, Amer. No. 3.....	11.00 @ 12.00
Blue, Celestial.....	6 @ 8
Blue, Chinese.....	25 @ 40
Blue, Prussian.....	8 @ 25
Blue, Ultramarine.....	3 @ 1
Brown, Spanish.....	3 @ 1
Brown, Vandyke, Amer.....	3 @ 3 1/2
Brown, Vandyke, English.....	6 @ 8
Carmine, No. 40, in bulk.....	2.75 @
Carmine, No. 40, in boxes or barrels.....	2.85 @
Carmine, No. 40, in ounce bottles.....	3.75 @
Chalk, in bulk.....	1.75 @ 2.00
Chalk, in bbls., 100 lb.....	33 @ 40
China Clay, English.....	13.00 @ 18.00
Cobalt Oxide, prep'd.....	9.00 @ 11.00
Cobalt Oxide, black.....	1.90 @
lots 100 lb.....	1.90 @
less 100 lb.....	1.90 @
Green, Paris, in bulk.....	10 @ 10 1/2
Green, Paris, 170 @ 175 lb.....	10 @ 11
Green, Paris, small pack.....	12 @ 17
Green, Chrome, ordinary.....	6 @ 12
Green, Chrome, pure.....	22 @ 25
Lead, Eng., B.B. white.....	7 @ 8
Lead, Amn. White, dry or in oil.....	6 @
Kegs, lots less than 500 lb.....	6 @
Kegs, lots 500 lb to 5 tons.....	6 @
Kegs, lots 5 tons to 12 tons.....	5 1/2 @
Kegs, lots 12 tons and over.....	5 1/2 @
Lead, White, in oil, 25 lb tin pails, add to keg price.....	1 @ 1 1/2
Lead, White, in oil, 12 1/2 lb tin pails, add to keg price.....	1 @ 1 1/2
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price.....	1 @ 2 1/2
Lead, Red, bbls. and 1/2 bbls.....	5 1/2 @ 6 1/2
Lead, Red, kegs.....	5 1/2 @ 6 1/2
Litharge, kegs.....	5 1/2 @ 6 1/2
Litharge, bbls. and 1/2 bbls.....	5 1/2 @ 6 1/2

TERMS, &c.—Lead and Litharge.—On lots of 500 lb or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35 @ 1 1/2
Ocher, French Washed.....	1 1/2 @ 2 1/2
Ocher, German Washed.....	1 1/2 @ 3
Ocher, American.....	1 1/2 @ 1 1/2
Orange Mineral, English.....	8 1/2 @ 9
Orange Mineral, French.....	10 @ 10 1/2
Orange Mineral, German.....	8 1/2 @ 9
Orange Mineral, American.....	8 1/2 @ 8 1/2
Paris White, English Cliff stone.....	1.00 @ 1.15
Paris White, American.....	65 @ 75
Red, Indian, English.....	5 1/2 @ 7
Red, Indian, American.....	2 @ 6 1/2
Red, Turkey.....	9 @ 11
Red, Tuscan.....	9 @ 14
Red, Venetian, American.....	1.00 @ 1.10
Red, Venetian, English.....	1.20 @ 1.35
Sienna, Italian, Burnt and Powder.....	4 @ 5
Sienna, Ital., Burnt Lumps.....	1 1/2 @ 3 1/2
Sienna, Ital., Raw, Powder.....	4 1/2 @ 5 1/2
Sienna, Ital., Raw, Lumps.....	1 1/2 @ 3 1/2
Sienna, American, Raw.....	1 1/2 @ 1 1/2
Sienna, American, Burnt and Powdered.....	1 1/2 @ 1 1/2
Talc, French.....	10 @ 11
Talc, American.....	1 1/2 @ 1 1/2
Terra Alba, Frch. 100 lb.....	95 @ 1.25
Terra Alba, English.....	70 @ 80
Terra Alba, American No. 1.....	65 @ 75
Terra Alba, American No. 2.....	45 @ 60
Umber, Turkey, Burnt and Powdered.....	3 1/2 @ 4
Umber, Turkey, Bnt. Ln.....	2 1/2 @ 3
Umber, Turkey, Raw and Powdered.....	3 1/2 @ 4
Umber, Turkey, Bnt. Amer.....	1 1/2 @ 2 1/2
Umber, Turkey, R/w Amer.....	1 1/2 @ 1 1/2
Yellow, Chrome.....	10 @ 25
Vermilion, American Lead.....	11 @ 12
Vermilion, Quicks' er, bulk.....	43 @
Vermilion, Quicks' er, bags.....	44 @
Vermilion, Quicksilver snr.....	52 @
Vermilion, English Import.....	80 @ 85
Vermilion, Imitation, Eng.....	8 @ 30
Vermilion, Trieste.....	90 @ 92 1/2
Vermilion, Chinese.....	82 1/2 @ 95
Whiting Common, 100 lb.....	37 1/2 @ 42 1/2
Whiting Gliders.....	45 @ 55

Zinc, American, dry..... 3 1/2 @ 4 1/2
 Zinc, French, Red Seal..... 7 1/2 @
 Zinc, French, Green Seal..... 7 @
 Zinc, French, V. M. X..... 7 @
 Zinc, Antwerp, Red Seal..... 7 1/2 @
 Zinc, Antwerp, Green Seal..... 7 1/2 @
 Zinc, German, L. Z. O..... 6 1/2 @ 7 1/2
 Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over..... 10 1/2 @ 11 1/2
 lots less than one ton..... 11 @ 11 1/2
 Zinc, V. M. in Poppy Oil, Red Seal..... @
 lots of 1 ton and over..... 10 @ 10 1/2
 lots of less than 1 ton..... 10 1/2 @ 10 1/2
 Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2; 25 bbls., 2 1/2; 50 bbls., 4 1/2. No discount allowed on less than bbl. lots.

Colors in Oil—

Black, Drop, Frankfurt.....	25 @ 30
Black, Drop, English.....	12 @ 15
Black, Drop, Domestic.....	7 @ 10
Black, Lampblack, Best.....	20 @ 35
Black, Lampblack, Common.....	7 @ 13
Black, Ivory.....	8 @ 15
Blue, Chinese.....	35 @ 40
Blue, Prussian.....	20 @ 45
Blue, Ultramarine.....	12 @ 18
Brown, Vandyke.....	7 @ 12
Green, Chrome.....	8 @ 13
Green, Paris.....	16 @ 18 1/2
Sienna, Raw.....	7 @ 14
Sienna, Burnt.....	7 @ 14
Umber, Raw.....	7 @ 10
Umber, Burnt.....	7 @ 10

Putty—

In barrels and 1/2 bbls.....	.01 1/2 @ .01 1/2
In tubs.....	.01 1/2 @ .01 1/2
In tin cans.....	.01 1/2 @ .02 1/2
In bladders.....	.01 1/2 @ .02 1/2

Spirits Turpentine—

In regular bbls.....	@ 30 1/2
In machine bbls.....	@ 31

Glue—

Low Grade.....	8 @ 10
Cabinet.....	12 @ 14
Medium White.....	13 @ 15
Extra White.....	17 @ 20
French.....	10 @ 22
English.....	10 @ 15
Irish.....	12 @

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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CURRENT METAL PRICES.

FEBRUARY 14, 1894.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron:

1/2 to 2 in. round and square...	1/2 lb 1.80 @ 1.90
1 to 6 in. x 1/2 to 1 in.	1/2 lb 1.80 @ 2.00

Refined Iron:

1/2 to 2 in. round and square...	1/2 lb 1.90 @ 2.00
1 to 4 in. x 1/2 to 1 in.	1/2 lb 2.10 @ 2.20
4 to 6 in. x 1/2 to 1 in.	1/2 lb 2.10 @ 2.20
1 to 6 in. x 1/2 and 5-16.....	1/2 lb 2.10 @ 2.20
Rods—1/2 and 1-16 round and sq.	1/2 lb 2.00 @ 2.10
Bands—1 to 6 x 3-16 to No. 12...	1/2 lb 2.20 @ 2.30
"Burden Best" Iron, base price...	1/2 lb 2.20 @ 2.30
Burden's "H. B. & S." Iron, base price...	1/2 lb 2.80
"Uster".....	1/2 lb 3.00
Norway Bars.....	1/2 lb 3.75 @ 4.00
Norway Shapes.....	1/2 lb 4.50 @ 5.00

Merchant Steel from Store—

Open-Hearth and Bessemer Machinery, Per lb

Tire Calc, Tire and Sleigh Shoe, base price in small lots	2 1/2¢
Best Cast Steel, base price in small lots	8¢
Best Cast Steel Machinery, base price in small lots	5¢

Sheet Iron from Store—

Black

Best Refined Iron.

Nos. 14 to 20.....	3¢ @ 3 1/2¢
21 to 24.....	3 1/2¢ @ 3 3/4¢
25 to 28.....	3 3/4¢ @ 3 1/2¢
27.....	3 1/2¢ @ 3 3/4¢
28.....	3 3/4¢ @ 3 1/2¢

Common 1/4¢ less than the above.

Open Hearth Steel.

Best Soft Steel, Nos. 14 to 16..... 2 1/2¢ @ 2 5/8¢

18 to 20..... 2 5/8¢ @ 3¢

21 to 24..... 3¢ @ 3 1/4¢

25 to 28..... 3 1/4¢ @ 3 1/2¢

27 to 28..... 3 1/2¢ @ 3 3/4¢

Best Bloom Sheets, 1/4" extra over above prices.

Best Bloom, Galvanized, jobbing dis. 70 @ 70 1/2

Ordinary Bessemer, 1/4" @ 1/4" lower than above prices.

Russia, Planished, &c.

Genuine Russia, according to assortment..... 12¢ @ 13¢

Patent Planished..... 12¢ @ 13¢

Craig Polished Sheet Steel..... 8 1/2¢

Foreign Steel from Store—

Best Cast..... 15¢

Extra Cast..... 16¢

Swaged, Cast..... 16¢

Best Double Shear..... 15¢

Blister, 1st quality..... 12¢

German Steel, Best..... 9¢

2d quality..... 8¢

3d quality..... 8¢

Sheet Cast Steel, 1st quality..... 15¢

2d quality..... 14¢

3d quality..... 14¢

R. Mushet's "Special"..... 48¢

"Titanic" Annealed..... 20¢

Eicken's Special No. 8..... 30¢

Extra..... 15¢

METALS—

Tin—

Banca, Pigs..... 21 1/2¢ @ 21¢

Straits, Pigs..... 20 1/2¢ @ 21¢

Straits in Bars..... 22¢ @ 22 1/2¢

Tin Plates—

Duty: 2 1/2¢ # lb.

Guaranteed Plates command special prices, according to quality.

Melny and Calland Grade. IC, 10 x 14..... @ \$6.50

" " " " IC, 12 x 12..... @ 6.75

" " " " IC, 14 x 20..... @ 6.50

" " " " IC, 20 x 28..... @ 13.00

" " " " IX, 10 x 14..... @ 8.50

" " " " IX, 12 x 12..... @ 8.75

" " " " IX, 14 x 20..... @ 8.50

" " " " IX, 20 x 28..... @ 17.00

" " " " DC, 12 1/2 x 17..... @ 6.00

" " " " DX, 12 1/2 x 17..... @ 8.00

Alway Grade..... IC, 10 x 14..... @ 6.00

" " " " IC, 12 x 12..... @ 6.25

" " " " IC, 14 x 20..... @ 6.00

" " " " IC, 20 x 28..... @ 12.00

" " " " IX, 10 x 14..... @ 7.25

" " " " IX, 12 x 12..... @ 7.50

" " " " IX, 14 x 20..... @ 7.25

" " " " IX, 20 x 28..... @ 14.50

" " " " DC, 12 1/2 x 17..... @ 5.50

" " " " DX, 12 1/2 x 17..... @ 6.75

Coke Plates—Bright—

eel Coke.—IC, 10 x 14, 14 x 20..... @ \$5.40 @ \$5.50

10 x 20..... @ 8.25

20 x 28..... 11.50 @ 12.00

IX, 10 x 14, 14 x 20..... @ 6.50

IX, 14 x 20..... @ 6.50

Charcoal Plates—Terne—

Guaranteed Plates command special prices according to quality.

Dean Grade.—IC, 14 x 20..... @ \$5.65

20 x 28..... @ 11.00

IX, 14 x 20..... @ 6.40

IX, 14 x 20..... @ 12.80

Abecarne Grade.—IC, 14 x 20..... @ 5.50

20 x 28..... @ 10.75

IX, 14 x 20..... @ 6.40

20 x 28..... @ 12.80

Tin Boiler Plates—

IX, 14 x 28..... 112 sheets..... @ \$13.35

IX, 14 x 28..... 112 sheets..... @ 14.50

IX, 14 x 31..... 112 sheets..... @ 16.00

American Terne Plates.—Apollo.

IC, 14 x 20..... @ \$6.25

IC, 20 x 28..... @ 12.50

IX, 14 x 20..... @ 7.25

IX, 20 x 28..... @ 14.50

Copper—

Duty: Pig, Bar and Ingot, 1 1/2¢; Old Copper, 1¢

Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad valorem.

Ingot—

Lake..... @ 11¢

Ansonia grade Arizona..... @ 10 1/2¢

Ansonia grade Casting..... @ 10¢

Sheet and Bolt—

Prices adopted by the Association of Copper Manufacturers of the United States, May 19, 1892. Subject to a discount of 15¢ @ 35¢, according to size of order. Stub's gauge standard.

Not wider than	Not longer than	And longer than	Weights per sq. foot and prices per pound.									
			Over 64 oz.	62 to 64 oz.	60 to 62 oz.	58 to 60 oz.	56 to 58 oz.	54 to 56 oz.	52 to 54 oz.	50 to 52 oz.	48 to 50 oz.	Less than 48 oz.
30—72	72	22	22	22	22	23	24	25	26	27	28	30
30—96	96	22	22	22	22	23	24	25	26	27	28	30
36—96	96	22	22	22	22	23	24	25	26	27	28	30
48—96	96	22	22	22	22	23	24	25	26	27	28	30
48—96	96	22	22	22	22	23	24	25	26	27	28	30
60—96	96	22	22	22	22	23	24	25	26	27	28	30
60—96	96	22	22	22	22	23	24	25	26	27	28	30
64—96	96	22	22	22	22	23	24	25	26	27	28	30
84—96	96	22	22	22	22	23	24	25	26	27	28	30
Over 84 in. wide		25	27									

Bolt Copper, 1/2 inch diameter and over, 1/2 lb 22¢

Circles, Segments and Pattern Sheets, 60 in. diameter and less, 3/4 lb advance over prices of Sheet Copper required to cut them from.

Circles, Segments and Pattern Sheets, over 60 in. diameter, up to 96 in. diameter inclusive, 4 1/2 lb advance over prices of Sheet Copper required to cut them from.

Circles, Segments and Pattern Sheets, over 96 in. diameter, 5 1/2 lb advance over prices of Sheet Copper required to cut them from.

Cold or Hard Rolled Copper 14 oz. square foot and heavier, 1 1/2 lb over the foregoing prices.

Cold or Hard Rolled Copper lighter than 14 oz square foot, 2 1/2 lb over the foregoing prices.

All Polished Copper, over 20 in. wide, 2 1/2 lb advance over the foregoing prices.

Copper Bottoms, Pits and Flats—

14 ounce to square foot and heavier..... 24¢

12 ounce and up to 14 ounce to square foot..... 27¢

10 ounce and up to 12 ounce..... 27¢

Lighter than 10 ounce..... 32¢

Circles less than 8 inches diameter, 2 1/2 lb additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

15¢ @ 25¢ discount, according to size of order.

Copper Wash Bowl Bottoms—

Tinned..... 1/2 lb 34¢, 15¢ @ 25¢

Tinning—

Tinning sheets on one side, 10, 12 and 14 x 48 each..... 8¢

Tinning sheets on one side, 30 x 60 each..... 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each..... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each..... 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each..... 12¢

Tinning sheets on one side, other sizes, per square foot..... 2 1/2¢

For tinning both sides double the above prices.

Planished Brass and Copper—

Not larger than 30 x 60.

16 oz. and heavier..... 24¢ # lb

14 oz..... 25¢ # lb

12 oz..... 27¢ # lb

Seamless Brass Tubes—

Standard always Stub's gauge, unless otherwise ordered.

O. G.	N. G.	%	%	%	%	%	1	1 1/2
8-14	6-12	32	28	25	24	23	22	19
15	13	33	28	26	25	24	23	20
16	14	34	29	27	26	25	24	20
17	15	35	30	28	27	26	25	21
18	16	37	31	29	27	26	25	22
19	17	38	32	30	29	28	27	24
20	18-19	39	34	32	31	30	29	26
21	20	41	36	34	33	32	31	29
22	21	43	37	35	34	33	32	31
23	22	45	39	37	36	35	34	34
24	23	48	41	39	38	36	35	36
25	24	51	44	41	40	39	38	40

Copper, Bronze and Gilding Tube, 3/8" # lb additional

Brass Tubes, (To No. 20 inclusive), Brown & Sharpe's gauge standard.

Above 5-16 inch to 3 inch, inclusive..... 35¢

Plain, above 3 inch..... 45¢

Plain, 5-16 inch..... 45¢

Plain, 1/4 inch..... 60¢

Plain, 3-16 inch..... \$1.00

Plain, 1/2 inch..... \$1.50

Fancy Tubing, Brass, to No. 20 inclusive..... 45¢ # lb

Bronze Tubing, 3/8" # lb more than Brass.

Discount from list..... 30¢ @ 1/2

Roll and Sheet Brass—

(Brown & Sharpe Standard Gauge.)

Common High Brass:	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2	10	12	14	16	18	20	22
Te No. 20, inclusive	21	22	23	24	25	26	27	28
Nos. 21, 22, 23 and 24	22	23	24	25	26	27	28	29
Nos. 25 and 26	23	24	25	26	27	28	29	30
Nos. 27 and 28	24	25	26	27	28	29	30	31

Common High Brass:	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	24	26	28	30	32	34	36	38
To No. 20, inclusive	36	37	38	39	40	41	42	43
Nos. 21, 22, 23 and 24	37	38	39	40	41	42	43	44
Nos. 25 and 26	38	39	40	41	42	43	44	45
Nos. 27 and 28	39	40	41	42	43	44	45	46

Discount from List 15¢ to 25¢.

Brass and Copper Wire—

List January 17, 1894.

Numbered by Stub's gauge.	Soft and hard high brass.	Spring high brass.	Low brass.	Copper.
All Nos. to No. 16, inclusive.	\$0.22	\$0.24	\$0.26	\$0.30
No. 17 and No. 18	.23	.25	.27	.31
No. 19 and No. 20	.24	.26	.28	.32
No. 21, or 0.032 diameter	.25	.27	.29	.33

Discount 15¢ to 25¢.

Fine Numbers.

Numbered by London gauge.	Brass.	Spring high brass.	Low brass.	Copper.
No. 22.....	\$0.26	\$0.28	\$0.30	\$0.34
No. 23.....	.28	.30	.32	.36
No. 24.....	.30	.32	.34	.38
No. 25.....	.32	.34	.36	.40
No. 26.....	.35	.37	.39	.43
No. 27.....	.38	.40	.42	.46
No. 28.....	.42	.44	.46	.51
No. 29.....	.45	.47	.49	.54
No. 30.....	.48	.50	.52	.57
No. 31.....	.51	.53	.55	.60
No. 32.....	.55	.57	.59	.64
No. 33.....	.59	.61	.63	.68
No. 34.....	.64	.66	.68	.73
No. 35.....	.70	.72	.74	.79
No. 36.....	.76	.78	.80	.85
No. 37.....	1.00	1.02	1.04	1.10
No. 38.....	1.30	1.32	1.34	1.40
No. 39.....	2.00	2.02	2.04	2.10
No. 40.....	2.60	2.62	2.64	2.70

— 1/2 discount.

Spring Wire, 2¢ # lb advance.

Copper Belt and Hose Rivets and Burrs—

No.	Per lb.	No.	Per lb.
No. 5.....	49¢	No. 11.....	56¢
No. 6.....	49¢	No. 12.....	58¢
No. 7.....	49¢	No. 13.....	60¢
No. 8.....	50¢	No. 14.....	62¢
No. 9.....	52¢	No. 15.....	70¢
No. 10.....	54¢		

60¢ @ 5¢ discount.

Tobin Bronze—Rods.

Drawn Rods for Bolts, Forgings, &c.

1/2 to 3/4 inches inclusive.....	17¢ # lb
Over 3/4 to 5 inches inclusive.....	18¢ # lb

Flat on Rods, Finished True, Smooth and Straight.

1/2 to 3/4 inches inclusive..... 18¢ # lb

Over 3/4 to 5 inches inclusive..... 19¢ # lb

Spelter—

Duty: Pig, Bars and Plates, \$1.50 # 100 lb.

Western Spelter..... 4 1/2¢

Bertha (pure)..... 8¢ @ 8 1/4¢

Zinc—

Duty: Sheet, 2 1/2¢ # lb.

600 lb casks..... 5 1/2¢ @ 6¢

Per lb..... 5 1/2¢ @ 6¢

Lead—

Duty: Pig, \$2 # 100 lb. Old Lead, 2¢ # lb. Pipe and Sheets, 2 1/2¢ # lb.

American Pig..... 3 1/2¢ @ 4¢

Bar..... 4 1/2¢

Pipe,

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